APRIL 14, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

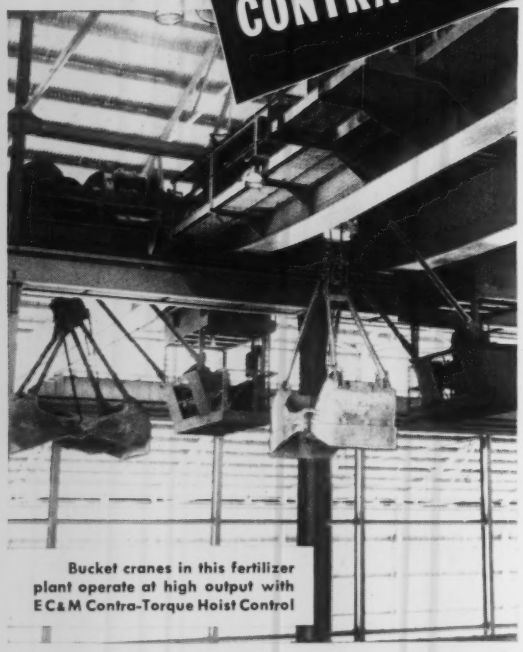
A PROGRAM FOR MANAGEMENT
1958 . . . No. 3

Defensework:
Manage It for Profit . . . Page 125

- ✔ Special Machines Slash Gearmaking Costs . . . Page 136
- ✔ Steel Producers Absorb More Freight . . . Page 191

CONTENTS — PAGE 5

Bucket crane of the Level-Luffing type operates speedily under EC&M Contra-Torque Hoist Control



Bucket cranes in this fertilizer plant operate at high output with EC&M Contra-Torque Hoist Control

HERE'S HOW EC&M FREQUENCY RELAY CONTROL improves A-C Bucket Crane performance

CONTRA-TORQUE®

FAST GETAWAY! Quickly responsive to the frequency of the induced-rotor voltage, EC&M FREQUENCY RELAYS match torque requirements to the load. They get the motor up to speed quickly for lowering the bucket and moving the trolley in or out. A lot of time saved between trips!

WIDE SPEED SELECTION! These relays permit pick-up of Contra-Torque lowering connections on any master switch speed point. No waiting until last down point is reached. Wider choice of speed gives greater flexibility in clean-up operations and speeds output!

SMOOTH STOPPING ELECTRICALLY! *Off-point braking** brings the descending load to rest and the magnetic brake sets to hold the load. Electrical braking has practically eliminated holding brake wear on many cranes now equipped with this feature.

SPEED-LIMITING! Safety on all speeds. These relays (one set for hoisting and lowering) automatically shift motor connections to safeguard lowering operation with far greater skill than human hands.

***Off-point braking** to eliminate brake wear
—a new EC&M development for AC bucket cranes

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

7407

BIG, but what is it?

Well, first of all, it's a forging, one of the largest of its kind that Bethlehem has ever made. But when you attempt to guess its purpose, you may be stumped, as others have been. It looks like a king-size bell, though of course it isn't that at all.

The husky forging is actually the top cylinder for a 6500-ton briquetting press. It had to be made with great care, and of just the right steel, for its job will be rugged. As you see it here, it stands 9 ft high and weighs just about 67 tons. Its maximum OD is 104 in.

Obviously, this is a special type of forging, a type you seldom encounter. You may never need anything of like design. But please remember, the Bethlehem shops make *every* type of forging, large and small, for every commercial requirement. Some of these pieces weigh a hundred tons and more; others weigh less than a pound.

We are always able to meet your specifications on press, hammer, and closed-die forgings, regardless of design. Call us when next in the market; you'll find that our prices and deliveries are fully competitive.

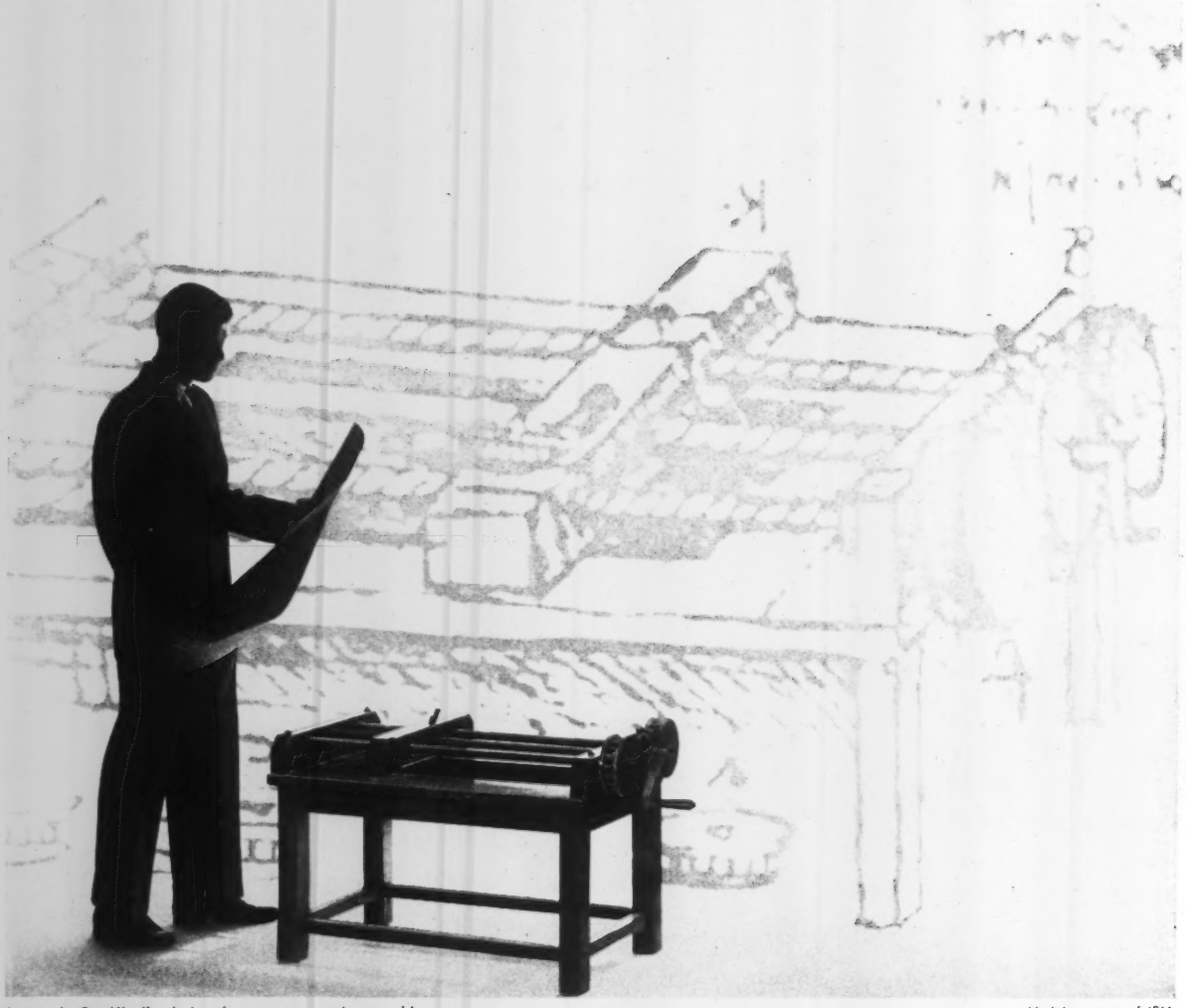
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

creative designing calls for an open mind



Leonardo Da Vinci's design for a screw cutting machine

Model courtesy of IBM

EVEN THIS DA VINCI DESIGN COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER.

The kind of bearings your SKF engineer recommends depends solely on your requirements, not on what he has to offer. That's because the SKF line includes all four basic types of ball and roller bearings in many thousands of sizes. This gives him the kind of flexibility he needs to keep an open mind on any bearing problem. Give your problem to SKF and see. 7832

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

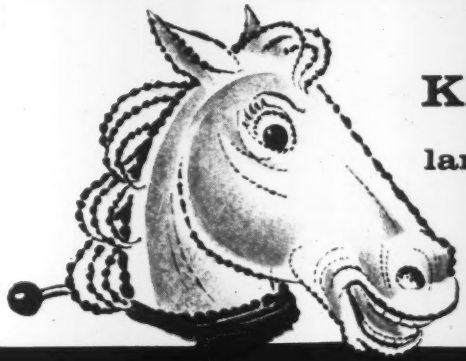
EVERY TYPE—EVERY USE

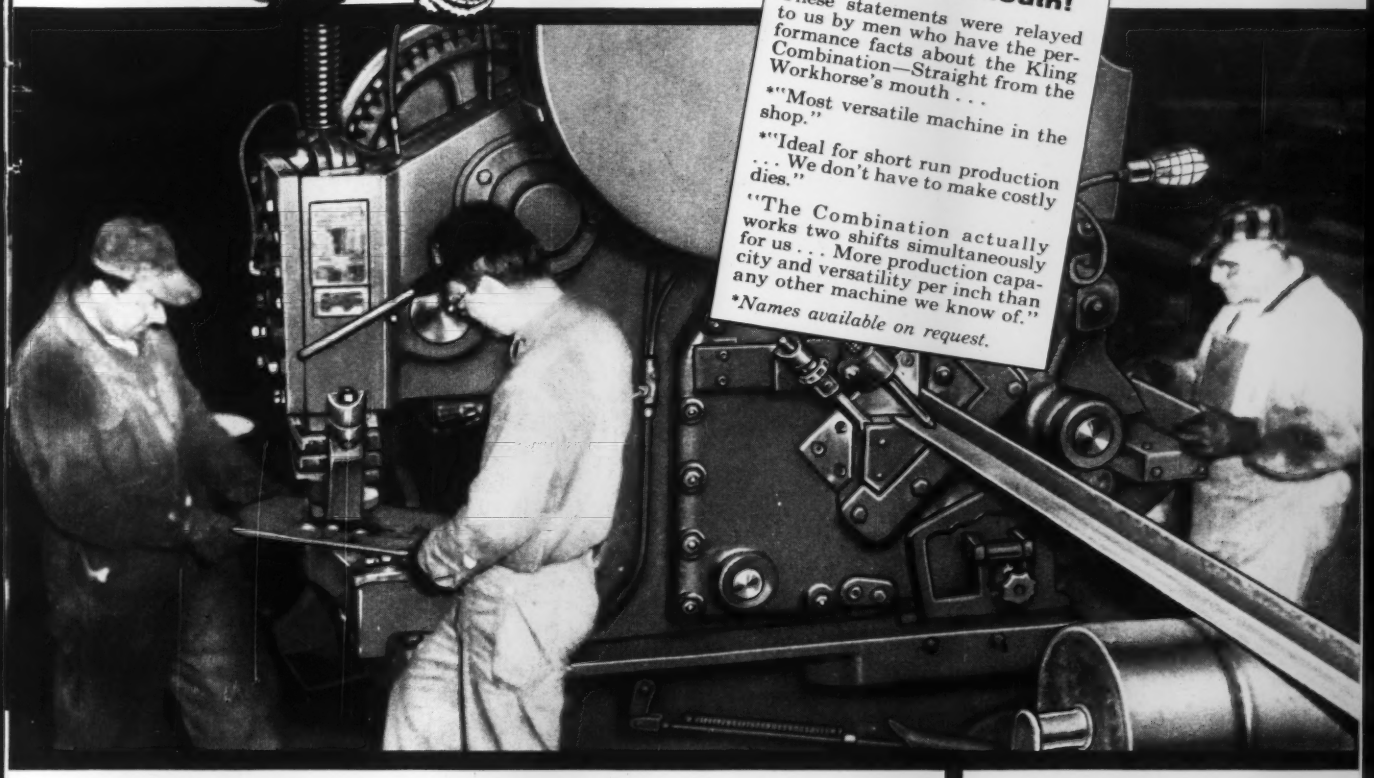
SKF

SKF INDUSTRIES INC. PHILADELPHIA 32, PA.

"REG. U. S. PAT. OFF.

Kling Workhorses speak the language production men love to hear!





RIGHT out of the horse's mouth!

These statements were relayed to us by men who have the performance facts about the Kling Combination—Straight from the Workhorse's mouth . . .

*"Most versatile machine in the shop."

*"Ideal for short run production . . . We don't have to make costly dies."

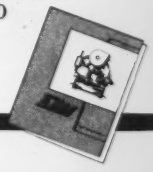
"The Combination actually works two shifts simultaneously for us . . . More production capacity and versatility per inch than any other machine we know of."

*Names available on request.

*"Reduced Shearing time 30.8% and Punching time 62% with the Kling Combination."

For versatile, all-around performance, production men everywhere will tell you that the Kling Combination Shear, Punch and Coper is their choice as the "Jack-of-all-jobs." You can shear, punch, cope, notch, miter, cut, etc . . . in beams, bars, rounds, flats, angles and plates. Special attachments add even greater versatility . . . And, it's one of the most economical machines to operate and maintain.

We'd like you to get these facts straight from the men who have the facts . . . *the performance facts* . . . We'll gladly send you a list of Kling Combination Shear, Punch and Coper installations in your area. Write today for a list . . . and for complete technical bulletin #347A—Kling Brothers Engineering Works, 1320 North Kostner Ave., Chicago 51, Illinois.

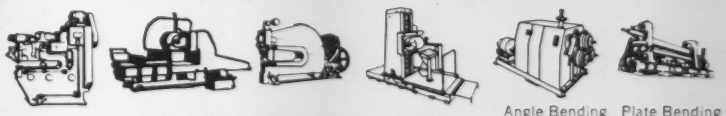


The Kling Combination Shear, Punch and Coper does all these operations and more . . .

- Bar Shearing
- Notching
- Punching in Angles
- Plate Slitting
- Coping Angles
- Coping Channels
- Angle Shearing

326

Kling Workhorse Machines



Rotary Shears | Friction Saws | Punches | Mill-All | Angle Bending Rolls | Plate Bending Rolls

Export Distributors: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, N. Y. • Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co. Ltd., Hamilton, Ont.

No matter which *FINISH* you like—you can buy it in

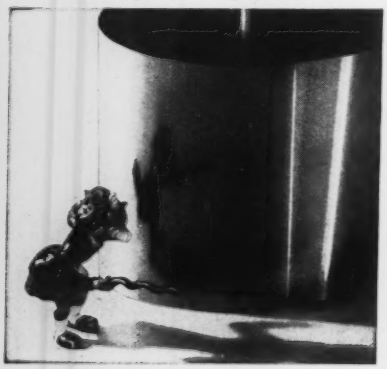
MicroRold® QUALITY STAINLESS STEEL

2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.



No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.

BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

WASHINGTON STEEL CORPORATION — MicroRold — STAINLESS SHEET & STRIP

Washington Steel *Corporation*

Producers of Stainless Sheet and Strip Exclusively

24-0 WOODLAND AVENUE, WASHINGTON, PA.

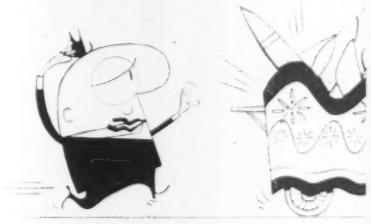
This Week in STEEL The Metalworking Weekly

April 14, 1958
Vol. 142 No. 15

EDITORIAL 83

The auto industry should give the public what it wants: A standard size car at a sensible price.

SPECIAL FEATURE 125



Managing Defensework for Profit—Opportunities in missiles and other areas for small and medium sized firms are tremendous. This article tells how to climb on (and stay on) the defense bandwagon.

WINDOWS OF WASHINGTON 92

Look for Congress to take a breather for two months while preparing for solid action on big issues during the summer.

MIRRORS OF MOTORDOM 99

Engineers are beginning to take economics into consideration in their plans to automate plants.

THE BUSINESS TREND 103

Similarity between current and past recessions indicates bottom of dip is near.

WHERE TO FIND—

Behind the Scenes 6
Letters to the Editors 10
Editorial & Business Staffs .. 16
Calendar of Meetings 23
Men of Industry 107
New Products 163
New Literature 182
Advertising Index 218

Business— METALWORKING OUTLOOK 79

☑ Key Issues Take Shape—A rundown on auto contract talks 85
☑ Machinery Rentals: New Lease on Life?—It'll pay to check .. 86
Photography Does Many Jobs—Here are 62 ways to use it 88
Photo Firms Report: Sales Rise Despite Foreign Competition .. 89
Supervisor Pay Rises 5.2 Per Cent in 1957, AMA Reports 90
British Domestic Steel Prices Cut 1 to 1.5 Per Cent 90
Aluminum To Recoup—Prospects good, says Aluminium Ltd. .. 91
Inco Develops Welding Wire—It will join dissimilar metals 91
Metallic Fuels Become Vital—Boron-based type in spotlight 95
☑ Nonferrous Role in 'Birds'—It's vital but not big tonnage 96
New Wire Source—J&L to make stainless product at Detroit 113
Managing Defensework for Profit—No. 3 in Management Series 125

Production— TECHNICAL OUTLOOK 135

☑ Special Machine Cuts Gear Costs—Output upped 200 per cent .. 136
☑ Are These Tomorrow's Machining Speeds? 138
Cast Stainless Stands Up to Pickle Liquor 141
Shotblasting Cuts Costs—Proves worth in volume production 142
Progress in Steelmaking—Gas Atomizes Open-Hearth Fuel 144
Test for Magnetic Chucks—Simple device checks grip 150
Billets Scalped Six Times Faster—Both sides cut at once 152
Drive Delivers Constant Horsepower—Range is 13.5 to 1 154
☑ System Keeps Tab on Production—Saves $80,000 in first year .. 160

Markets— MARKET OUTLOOK 189

☑ Mills Pay More Freight—Push into new market areas 191
Iron Ore Statistics for February, 1958 198
Steel Shipments Smaller—AISI report on finished products 198
Pace of Scrap Decline Slackening 210
Nonferrous Metals—Prices Firm for Moment 214

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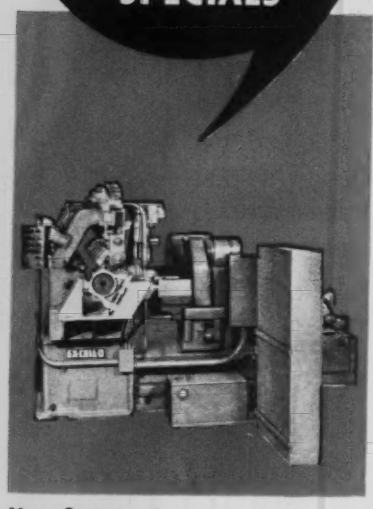
STEP-BY-STEP AUTOMATION WITH EX-CELL-O SPECIALS



Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

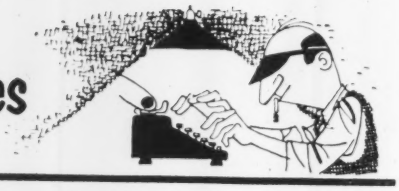
This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.

XLO EX-CELL-O FOR PRECISION

57-88

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

behind the scenes



The Income Tax Address

One year ago Howard W. Rider, managing editor, *The Eaton News*, published monthly by the Industrial Relations Dept. of Eaton Mfg. Co., Cleveland, ran an item headed "Gettysburg Address—Rewritten!" Howard confessed that he picked it up, and we would have, too, but time was a factor. Now that we have completed the circle to income tax time again, the item is cued perfectly. Here it is:

Two score and four years ago, our fathers brought forth upon this nation a new tax, conceived in desperation and dedicated to the proposition that all men are fair game. Now we are engaged in a great mass of calculation, testing whether the taxpayer, or any taxpayer, so confused and so impoverished, can long endure. We are met on Form 1040.

We have come to dedicate a large portion of our income to a final resting place with those who spend their lives that they may spend our money. It is altogether anguish and torture that we should do this. But in the legal sense, we cannot evade, we cannot cheat, we cannot underestimate this tax. The collectors, clever and sly, who computed here, have gone far beyond our power to add or subtract.

Our creditors will little note nor long remember what we pay here, but the Internal Revenue Service can never forget what we reported here. It is for us, the taxpayers, rather to be devoted here to the tax return which the government has thus far so nobly spent. It is rather for us to be dedicated to the great task remaining before us—that from these vanished dollars we take increased devotion to the few remaining; that we here highly resolve that next year will not find us in a higher income tax bracket; that this taxpayer, underpaid, shall figure out more deductions; and that taxation of the people, by the Congress, and for the government shall not cause our solvency to perish.

Poultry Symptoms

Associate Copy Editor Glenn Dietrich had been noted clucking and cooing to himself of late, so we were moved to investigate. Aside from affecting a hat that was obviously designed after a snare drum, Glenn had never been regarded as eccentric. On the contrary, he has frequently been held up to the younger editors as a model of appearance and deportment, so when he began making like a hen, our curiosity, as the saying often goes, got the better of us.

"Mr. Dietrich, why are you going about clucking to yourself? It's ridiculous, of course, but there is a maternal aura about you. When did you first notice this condition?"

Glenn lowered his eyes modestly, and a rosy blush suffused his honest countenance. "In a way, I suppose I am a mother. That new, streamlined contents page you first noticed last week is my child, and I ain't just beatin' my gums, Mac, when I say that I'm proud of it."

Additional investigation revealed that Glenn wasn't throwing curves. Earlier in the year, during the course of a staff meeting to consider methods for improving STEEL, Glenn introduced his idea of a contents page. He was appointed chairman of a committee to develop the idea, and on Apr. 7 his brain child appeared on Page 5. From now on STEEL's contents page will appear in its new improved guise.

Other editorial staff committees are functioning these days, exploring and developing ideas for improving the nation's (Oh, why be modest: The world's!) foremost Metalworking Weekly, but we haven't been privileged to examine them. Nothing personal was intended, but something was said about a big mouth, or flapping gums, or talking out of turn, or something like that.

Defense Profits

When Artist Tom Bryan drew this week's cover (the little man reaching for a dollar attached to a missile), he fairly summed up the story "Managing Defense-work for Profit" (Page 125, No. 3, Program for Management Series), written by Washington Editor Jack Botzum. The little man represents business, and the dollar represents potential profits from the new defense technology. It is pretty well established that defense spending is rising moderately; moreover, we're switching to missiles, and the Pentagon has adopted the weapon system concept of procurement. Because of these developments, it is prudent to re-examine the profit possibilities in the defense business.

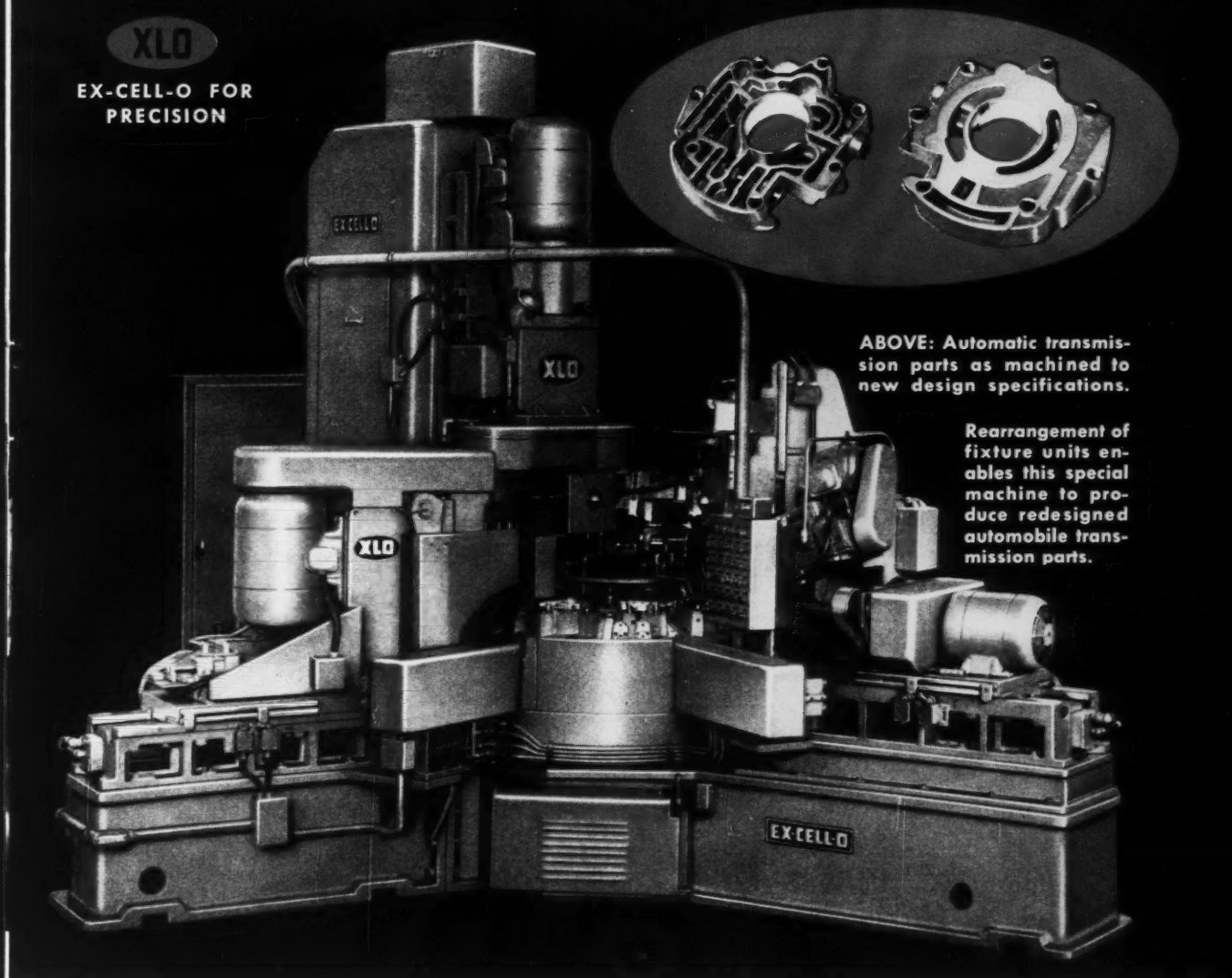
Isn't it fascinating to consider that your company soon might be tooling up to produce dingbats or widgets that will operate in space? It used to be that nations of the earth complained about their lack of space: Germany, and Italy, and Japan, to name a few. Even Russia, with the greatest area of all, feels obliged to expand. Now, with outer space almost ready for human occupancy, or vice versa, darned if everybody isn't making rockets and missiles and things to hinder each other from occupying it. Reminds us of the slogan: "People are no damn good."

Shrdlu

(Metalworking Outlook—Page 79)

XLO

EX-CELL-O FOR PRECISION



ABOVE: Automatic transmission parts as machined to new design specifications.

Rearrangement of fixture units enables this special machine to produce redesigned automobile transmission parts.

Parts changes didn't obsolete this special

Easily Adapted to Altered Workpieces

The first big parts change to come along will obsolete many a special machine—at a drastic cut into the production budget! But not so with this Ex-Cell-O special now operating at full tilt in an automobile plant in Detroit.

Built to process regulator valve bodies for automotive transmissions, this special machine was flexible enough to adapt to certain changes in tooling and operational cycles. Right now, it's turning out complicated parts at the rate of 120 per hour.

Machining includes fly-cutting both flat sides of aluminum part; drill and ream two piston holes; drill three angular holes; drill, ream and chamfer the top holes. Flatness of the two sides is an important requirement.

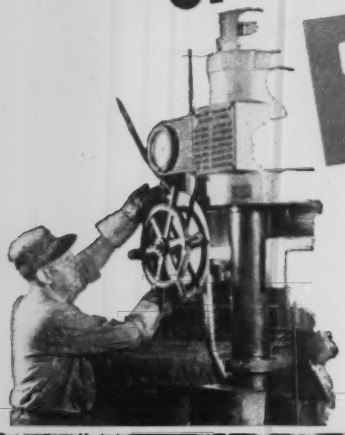
Ex-Cell-O specials have the extra precision you have come to expect of XLO products. Why not check with your Ex-Cell-O representative today? Or write Ex-Cell-O, Detroit.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN
Machinery Division

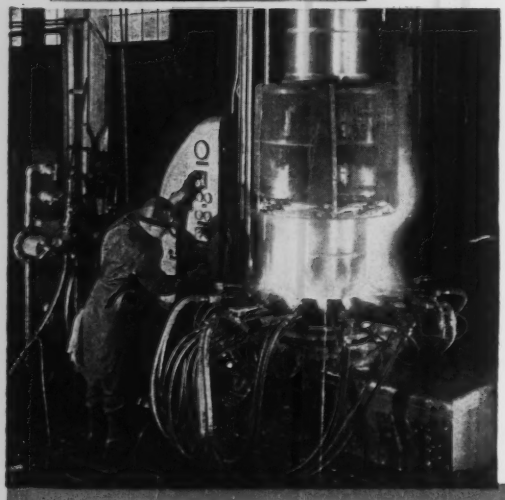
MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

57-26

YOU CAN'T BEAT THE COMBINATION OF SKILLS and EQUIPMENT



...which ONLY the Commercial Heat Treater can provide



Today's modern commercial heat treating plant might well be described as a "department store" for metal treating services. For under one roof are offered you not only the full range of heat treating equipment for all types of processes . . . but . . . of still greater importance, the manpower skills of the management and technicians of those supervising and performing your jobs. *Service* is their keynote.

Whatever your needs . . . whenever you need it . . .

● CONSULT YOUR COMMERCIAL HEAT TREATER!

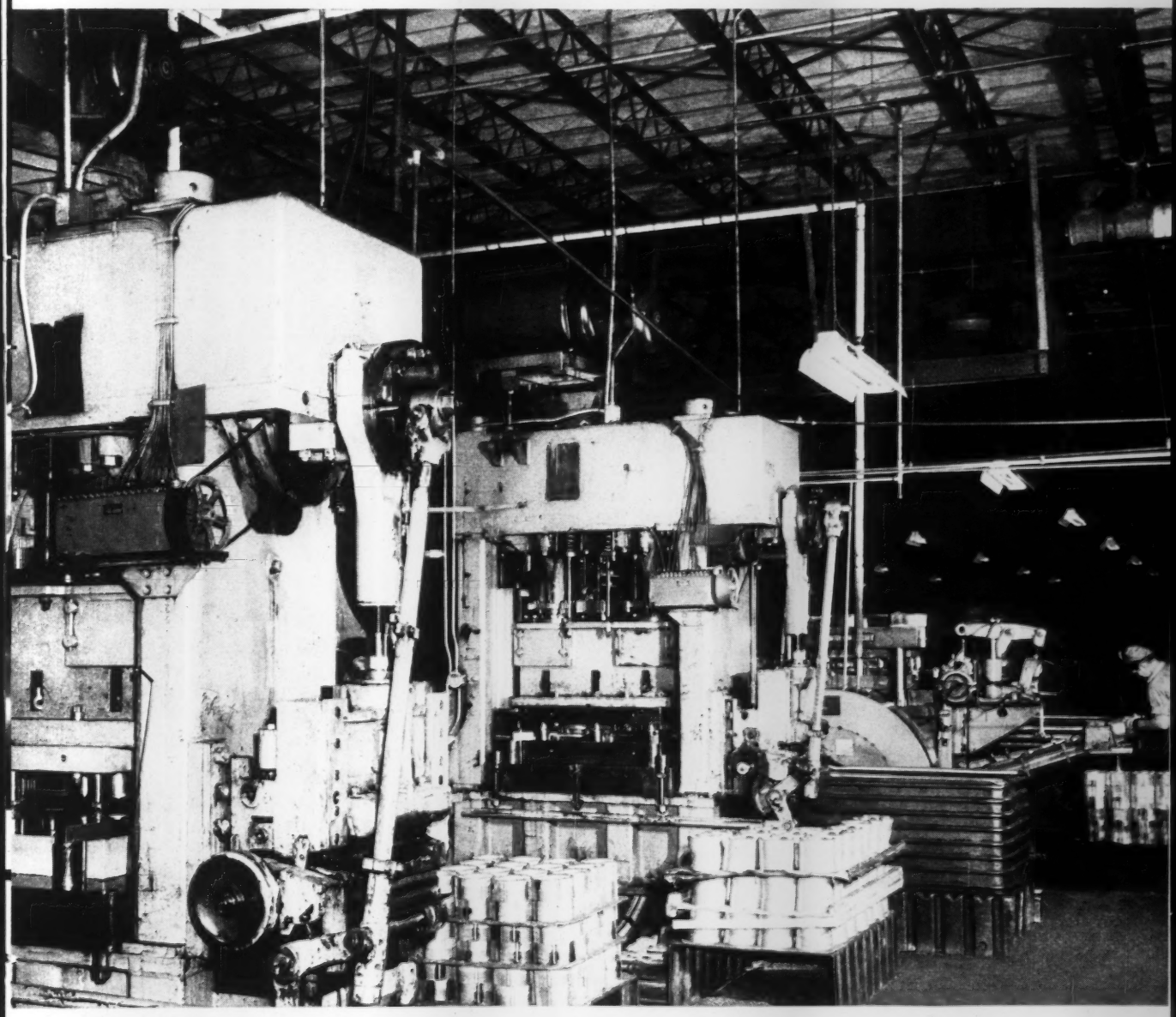
American Metal Treatment Co.
Elizabeth, New Jersey
Anderson Steel Treating Co.
Detroit, Michigan
Benedict-Miller, Inc.
Lyndhurst, New Jersey
Bennett Heat Treating Co., Inc.
Newark 3, New Jersey
Commercial Metal Treating, Inc.
Bridgeport, Connecticut
Cook Heat Treating Co. of Texas
Houston 11, Texas
The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio
Dominy Heat Treating Corp.
Dallas, Texas
Drever Company
Philadelphia 33, Pennsylvania
Greenman Steel Treating Company
Worcester 5, Massachusetts
Fred Heinzelman & Sons
New York 12, New York

MTI MASTER CRAFTSMEN METAL TREATING INSTITUTE

Alfred Heller Heat Treating Co.
New York 38, New York
Hollywood Heat Treating Co.
Los Angeles 38, California
Ipsenlab of Canada, Ltd.
Toronto, Ontario, Canada
Ipsenlab of Rockford, Inc.
Rockford, Illinois
L-R Heat Treating Company
Newark, New Jersey
The Lakeside Steel Improvement Co.
Cleveland 14, Ohio
Metallurgical, Inc.
Minneapolis 14, Minnesota
Metallurgical, Inc.
Kansas City 8, Missouri

New England Metallurgical Corp.
South Boston 27, Massachusetts
Owego Heat Treat, Inc.
Apalachin, New York
Paulo Products Company
St. Louis 10, Missouri
Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania
Pittsburgh Metal Processing Co., Inc.
Pittsburgh 15, Pennsylvania
The Queen City Steel Treating Co.
Cincinnati 25, Ohio
J. W. Rex Company
Lansdale, Pennsylvania
Stanley P. Rockwell Company
Hartford 12, Connecticut
Scott & Son, Inc.
Rock Island, Illinois
Syracuse Heat Treating Corp.
Syracuse, New York
Temperature Processing Co.
North Arlington, New Jersey

. . . Your best motor investment is Century



For Industry — Century Builds Better Motors

Making better electric motors is largely a matter of attitude of the manufacturer. At Century, that attitude is—a determination to make more dependable, more durable motors that will keep our customers out of trouble.

It's the little *extra* . . . in quality of materials . . . in sturdiness of construction . . . in quality control through inspection . . . that prevents costly down-time. Of course, the design must be right—to give you the power you need in a properly protected frame, and with smooth, quiet operation.

Century has acceptance throughout industry because of better industrial motors . . . properly applied. Let your local Century man or Authorized Century Distributor show you exactly why your best motor investment is Century.

Century
MOTORS

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

There are more than 5,000 stock types and sizes of nut running tools in the Apex stockrooms . . . and almost as many types and sizes of screwdriving tools. Apex—the authority on fastening—can supply the tools you need, when you need them.

Prompt delivery can be made on standard tools . . . immediate attention is given to specials. For rush emergency orders, Apex representatives in many principal cities maintain sizable stocks of the most used fastening tools.

Want to see what's in "your fastening tool stockrooms"? Write, on your company letterhead please, for Catalog 29-R—Nut Running Tools; Catalog 21—Screwdriving Tools; or Catalog 25—Magnetic Fastening Tools.

1933 *A Quarter Century of Service to Industry* 1958

THE APEX MACHINE & TOOL CO.
1032 S. Patterson Blvd.
Dayton 1, Ohio

TOOLS FOR screwdriving nut running FASTENING

LETTERS TO THE EDITORS

Well-Timed Editorial

Your editorial, "Let the Public Know" (Mar. 17, Page 41), was well-timed for us here at Cooper Alloy Corp. and served to confirm our own beliefs.

We agree with you wholeheartedly that the job can't be fully accomplished unless every company in industry takes up the cause.

The editorial appeared as we were preparing for "Youth Takes Over Industry Day," which is the second part of a three-part program. Part one is devoted to the elementary and high school teachers. In part three, key members of industry will go to the classrooms.

Our over-all program incorporates many projects of merit and has the co-operation, participation, and support of every company in the industrial community of Hillside, N. J. We honestly believe that the readers of STEEL, and the steel industry as a whole, can profit by a similar program initiated on the community level.

Raymond O'Brien
Public Relations Dept.
Cooper Alloy Corp.
Hillside, N. J.

Subject Is Well-Covered

Your article, "Foundries Limit Buying" (Mar. 24, Page 71), covers the subject clearly, concisely, and exactly.

C. V. Nass
Vice President & General Manager
Beardsley & Piper
Division of Pettibone Mulliken Corp.
Chicago

Editorial Is Provocative

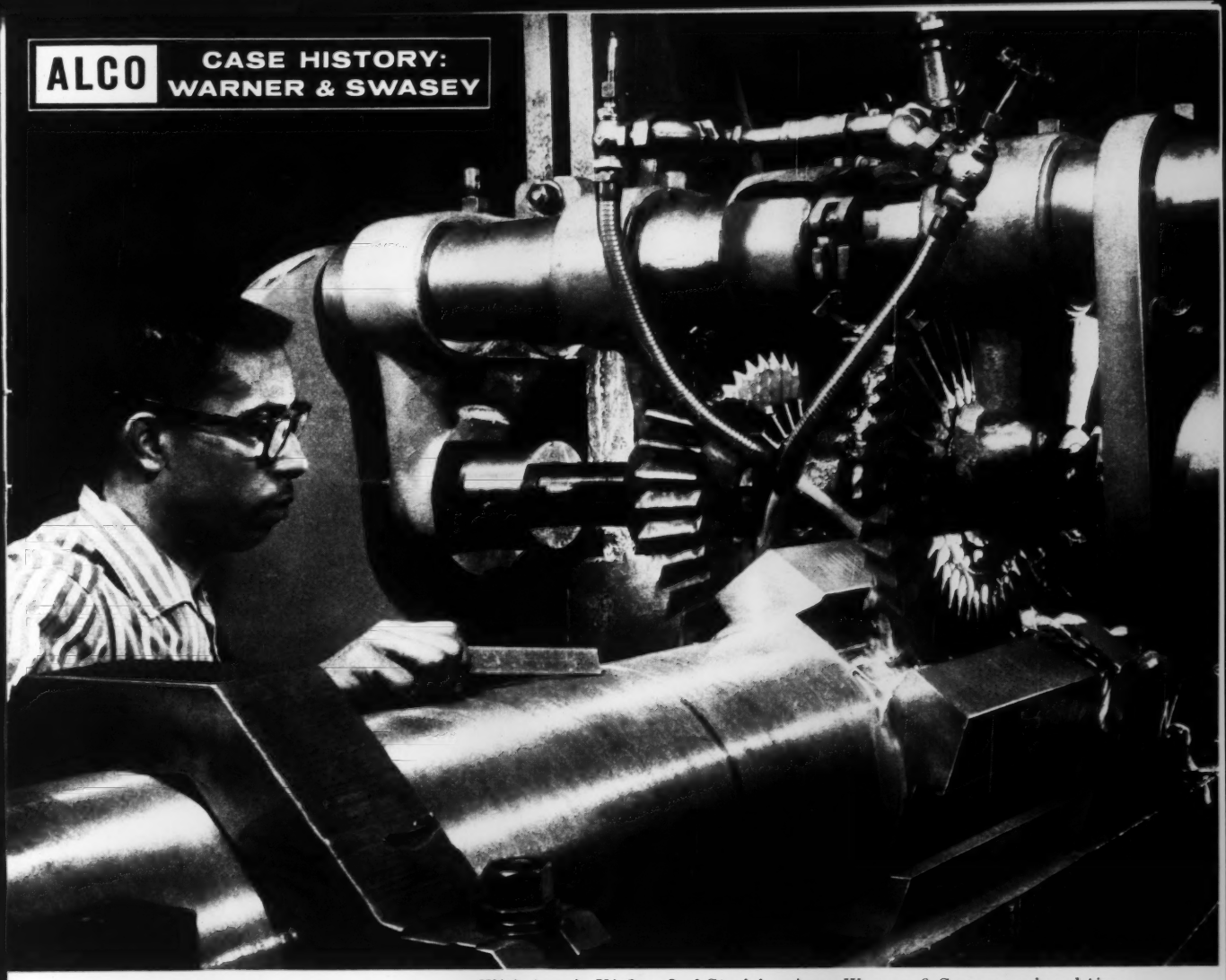
Your editorial, "No Time To Read?" (Mar. 31, Page 45), is provocative and appropriate. It drives home a point I have been pushing for some while. Could I have 25 copies to distribute in our organization?

R. Hilprecht
Sales Manager
McGregor-Michigan Corp.
Detroit

Story on Trademarks

Your story, "Trademarks Help You Sell" (Mar. 17, Page 54) covers trademarks in a comprehensive and concise way. But there was one unfortunate slip: At one place, a trademark owner is

(Please turn to Page 12)



With ALCO's *Hi-Qua-Led Steel forgings, Warner & Swasey reduced time for straddle-mill dovetailing of tool holder's pentagon shape by 71%.*

MACHINE TIME CUT 33%, TOOL LIFE TRIPLED WITH ALCO'S HI-QUA-LED® STEEL FORGINGS

With open-die forgings of ALCO's special free-machining Hi-Qua-Led Steel, Warner & Swasey has reduced machining time 33% on a pentagon-bar tool holder for their automatic chucking machine. Time for the various milling operations has been reduced as much as 71%, and turning time 33%.

Warner & Swasey has found that in every operation the use of Hi-Qua-Led forgings has meant savings in tool life, machining time or both. In the trepanning operation, run at the same speed as before, the life of expensive tools has increased up to three times.

ALCO's Hi-Qua-Led Steel forgings have unique advantages of machinability, while maintaining the physical characteristics of regular forgings of the same grade. Cost is just a few cents more. Circular shapes, forged and rolled, range from 18 to 145 in. OD; open-die shapes from 1000 to 30,000 lbs and up to 40 ft long; mandrelled ring forgings up to 60 in. wide.

Contact your nearest ALCO sales office for full information on the many advantages of Hi-Qua-Led Steel forgings, or write ALCO Products, Department 154, Schenectady, New York.

ALCO

ALCO PRODUCTS, INC.

NEW YORK

SALES OFFICES IN PRINCIPAL CITIES

LOCOMOTIVES • DIESEL ENGINES • NUCLEAR REACTORS • SPRINGS • STEEL PIPE • FORGINGS • OIL FIELD EQUIPMENT

Rubatex weatherstripping never leaks

No air, water, snow or dust get by its Closed Cellular structure

POMEROY custom-built hopper hinged windows—considered "the Cadillac of aluminum windows"—are weatherstripped with RUBATEX CLOSED CELLULAR NEOPRENE for the ultimate in efficiency.

RUBATEX was specified by Pomeroy, above all other gasketing materials tested, because it is completely impervious to water absorption or transmission, assures lifetime resistance to the elements, is extremely soft and conforms to any irregularity with the minimum of effort.

RUBATEX CLOSED CELLULAR NEOPRENE (Stock No. R-414-N, ASTM-SC-41) forms a continuous, self-sealing, permanent, leakproof gasket for hopper vent. Made from cushion-soft, light gray stock, especially developed for ease of installation and to beautifully blend with aluminum.

RUBATEX
LEAKPROOF WEATHERSTRIPPING

RUBATEX DIVISION, Dept. S-6
GREAT AMERICAN INDUSTRIES, INC.
Bedford, Virginia

For full details and sample of Rubatex Leakproof Weatherstripping—print your name in space below, attach to your company letterhead and mail to us.

Name _____

Send for Free Sample and Data Sheets

LETTERS

(Concluded from Page 10)

called a "patent" owner. I suppose we are overly sensitive about it, but patents, copyrights, and trademarks are so different.

As our president, Edgar S. Bayol, explains it: Both copyrights and patents are limited monopoly privileges created by statutory grant for a limited period. Trademarks, or brand names, are neither monopolies nor grants. Their function is to identify products. They gain their validity only through use . . . and they retain their validity—whether registered in the U. S. Patent Office or not—for an indefinite period.

Dorothy Fey
Executive Secretary
United States Trademark Association
New York

Formula Worked Out

In reading your fine Program for Management article, "Production Control for Profits" (March 17, Page 83), I was unable to apply the formula on Page 86 for calculating economic runs on machines. Could you send me an example that is worked out?

R. C. Solimano
Production Control Manager
Master Electric Co.
Dayton, Ohio

• *An example is being sent. We will be glad to forward a copy to other interested readers on request.*

Fine Processing Article

We would like to congratulate you on your fine article, "Direct Reduction Is Closer" (Mar. 17, Page 102). It was extremely well written.

J. S. Breitenstein
Assistant to the President
R-N Corp.
New York

Enjoys Whitecollar Story

Thank you for the excellent article, "Whitecollar Drive To Resume in '59, '60" (Mar. 24, Page 65). I enjoyed reading it and have gained knowledge from it.

Frank Santoro
Project Tooling Engineer
Aeronca Mfg. Corp.
Middletown, Ohio

Article Draws Inquiries

We were mentioned in your article, "Power Brushing Accelerates" (Feb. 24, Page 40). You will be interested to know that we have received inquiries from two of your readers, requesting us to do development work on their problems of deburring the inside of tubes by power brushing.

M. Verne Joy
Supervisor, Industrial Sales
Fuller Brush Co.
Hartford, Conn.

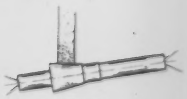
Versatility and quicker setups cut grinding costs for toolrooms and short run production

Landis 10" x 20" and 10" x 24" Universal Cylindrical Grinders feature Microsphere Wheel Spindle Bearings for maximum accuracy, high finishes and dependable operation.

LANDIS
precision grinders
LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

Grinding jobs which can be done on this machine

traverse and infeed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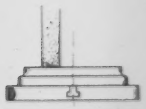
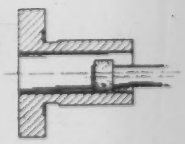

face and angle


internal—straight and angle

As you can see at the right, pre-war welders had considerably more guts than most of today's "so-called" heavy-duty units. If you need real heavy-duty machines–ask yourself

Where'd the GUTS .....

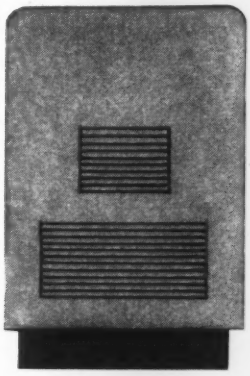
...you can still get 'em

Today's A. O. Smith Welders surpass even the best of pre-war units

PRE-WAR WELDER*	POST-WAR A. O. SMITH*
Average Copper Coil Weight 180 lbs.	**Copper Coil Weight 186 lbs.**
Height 46 in.	**Height 47½ in.**
Temperature rise — 55°	**Temperature rise — 55°**

**500 amp heavy-duty a-c welder*

NOTE: A. O. Smith also offers *the Challenger* line of a-c welders competitive in size and strength with today's "so-called" heavy-duty units.



PRE-WAR WELDERS*

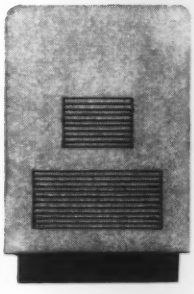
Average Copper Coil Weight 180 lbs.

Average Height 46 in.

Average Temperature rise 55°

**Heavy-duty a-c (500 amps)*

go?



POST-WAR WELDERS*

Average Copper Coil Weight 100 lbs.

Average Height 40 in.

Average Temperature rise 120°

**Heavy-duty a-c (500 amps)*

...but only from A.O.Smith!

The amount of copper in the coils is one of the largest single factors in the life expectancy and efficiency of a welding machine.

While many other types of equipment, through use of new materials and new design, have become smaller without any sacrifice in efficiency or service life — *welding machines are an exception!*

A. O. Smith welding machines have practically twice as much costly copper in their coils as other welders . . . they offer many other outstanding additional advantages. These advantages include 1/6-hp, totally-enclosed, ball-bearing, pre-lubricated fan motor (biggest in the industry) and 18-inch, big volume fan . . . Jet-stream ventilation . . . silicone insulation . . . and 75 open circuit volts.

Result, though rated at 60% duty cycles, these A. O. Smith welders could be operated at 100% duty cycles and still out-live competitive machines operating at 60%. There's nothing on the market today that can compare. Write direct or contact your man from A. O. Smith for conclusive evidence.

Through research A.O. Smith *. . . a better way*

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

A. O. Smith International S. A., Milwaukee 1, Wisconsin, U. S. A.

YOU CAN SAVE TIME, TROUBLE AND COSTS with

Formed Tubes...

★Save Time

We have a huge stock of dies and, when needed, tooling's fast. We also avoid delays by making our own electrically welded steel tubing, sizes from 5/8" to 3" OD.

★Save Trouble

Long, active experience with all tube forming processes and high standards of quality control make sure your orders will be completed *right.*

★Save Costs

It's routine for formed tubes parts to deliver top performance, save weight, cut costs. Steel, copper, brass, aluminum or stainless tubing fabricated in 3/8" OD to 6" OD sizes; from 20 to 11 ga. metal.

Formed Tubes, Inc.
404 Prairie, Sturgis, Michigan

Write for FREE Booklet

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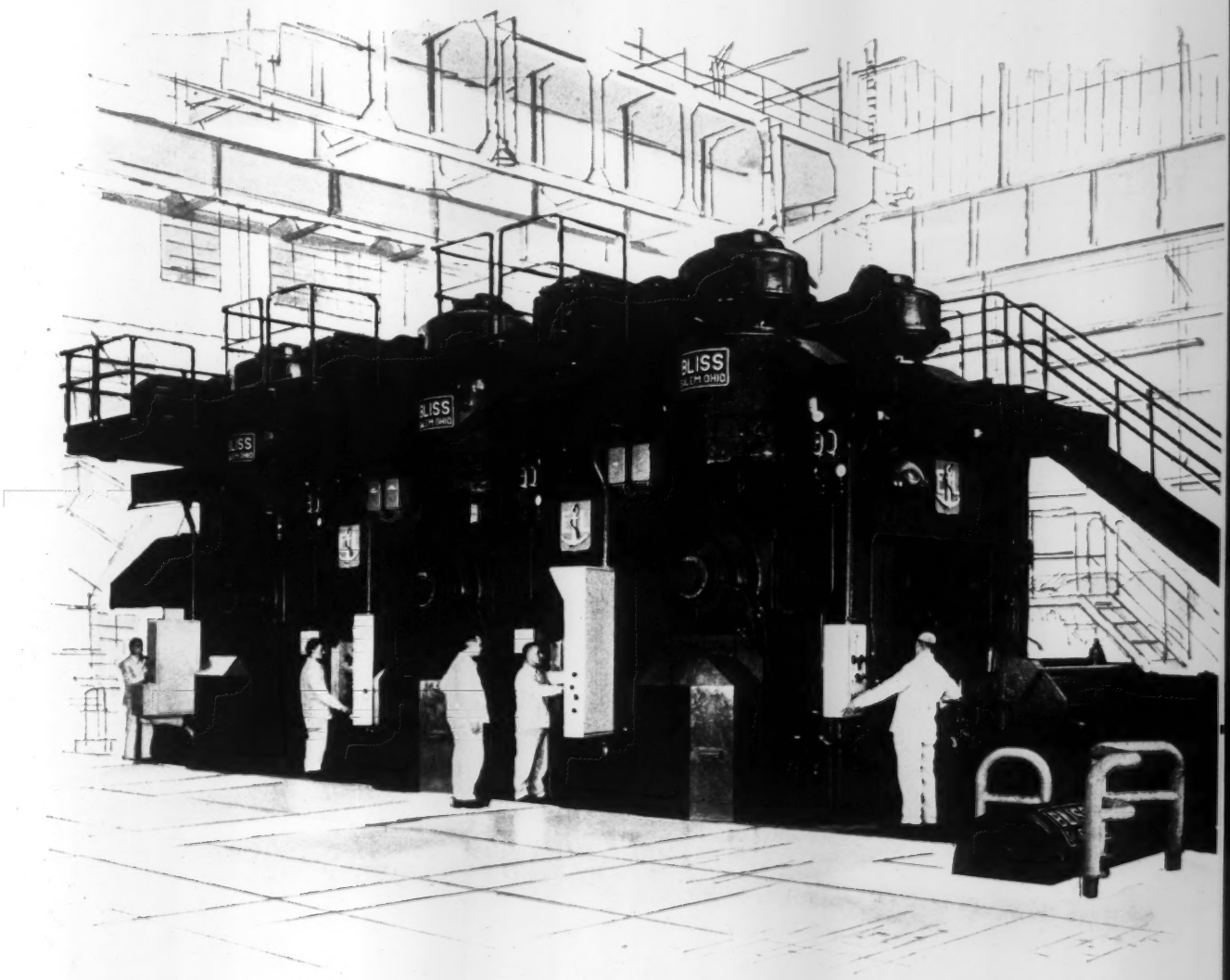


Espérance-Longdoz increases cold-rolling capacity with new Bliss mill

This 3-stand 4-high tandem mill at Ste. Ame. d'Espérance-Longdoz in Liège, Belgium is the first large multiple stand rolling mill in the Benelux countries. Built by Bliss' Rolling Mill Division, it rolls steel strip up to 52" wide from hot-rolled band down to thin cold-rolled strip. Mechanized entry and delivery equipment almost eliminate manual coil handling.

This modern cold reduction tandem mill is much more than ample for Espérance-Longdoz to convert its present 600,000-ton hot-rolled production. What's more, the mill is designed to allow later addition of a fourth stand.

This installation is a typical example of how Bliss engineers design a mill to meet a customer's particular rolling problem. For other examples, write for our 60-page Rolling Mill Brochure, Bulletin 40-A.

BLISS
SINCE 1857

100 years of making metal work for mankind

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

When a GISHOLT BALANCER tells you the story —you don't have to translate it!

Note that dial reading! It does more than you may suspect.

Unlike other balancing machines, it does not merely indicate amount of unbalance in arbitrary units and leave it to the operator to interpret in terms of correction. Gisholt Balancers can tell the story *directly* in terms of correction units. No translation needed. No computation. No charts or graphs.

Because of their infinitely variable sensitivity, Gisholt Balancers are easily adjusted for the job at hand. Correction units such as $\frac{1}{8}''$ lengths of wire solder, $\frac{1}{64}''$ depths for a certain size of drill, washers of a specific weight, etc., can be used. Readings, in terms of these units, are shown directly on the amount meter.

Think what that means in time saving alone! Yet this is only one of many ways Gisholt enables you to set—and maintain—higher standards for your balancing work.

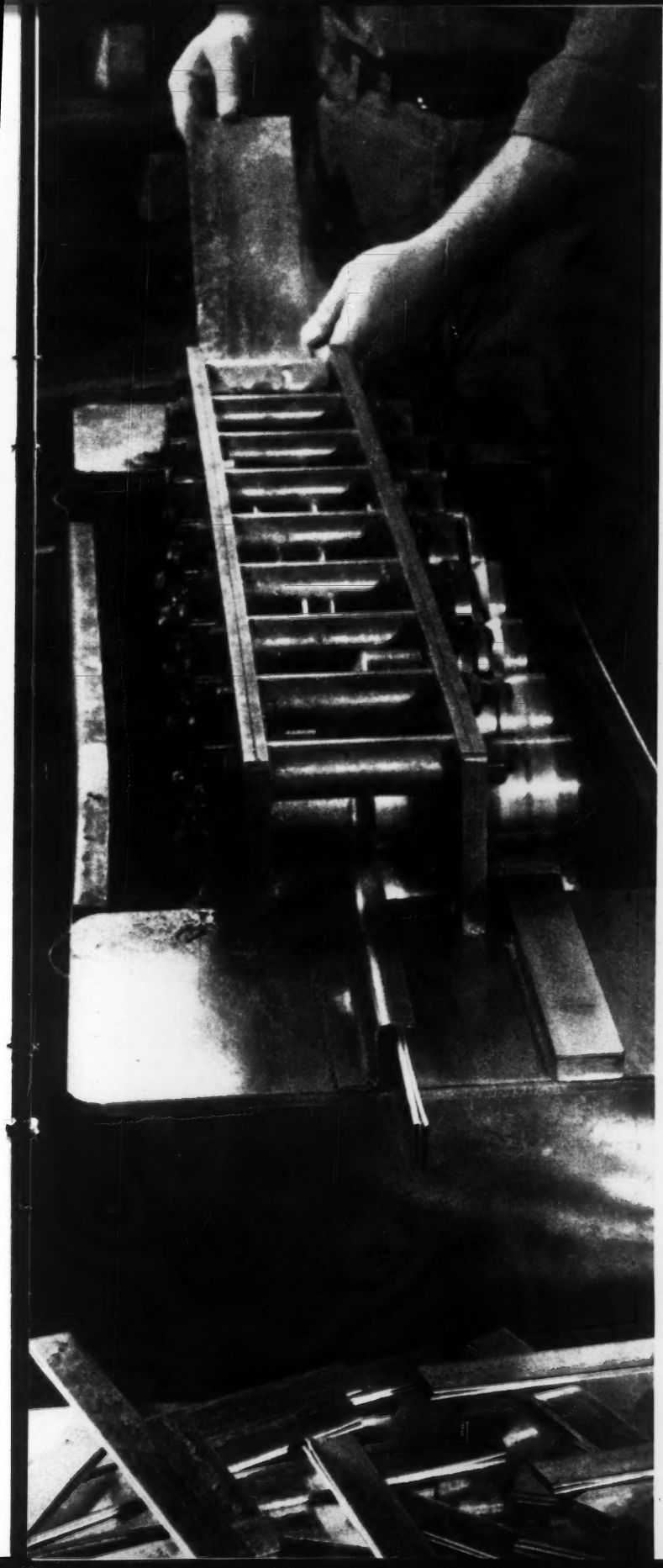
If your product includes the use of rotating parts, by all means check Gisholt for the most recent information on balancing.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin

DYNETRIC BALANCERS GISHOLT

DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION
DYNETRIC - IS A TRADE MARK SER. NO. 1 PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



"Short-radii bends? WEIRKOTE'S® zinc coating thrives on 'em!"

Weirkote's ability to take punishment is a big reason so many manufacturers are so enthusiastic about it.

Look at the "S" cleat fabrication at the left, for example. It's about as ornery a job as you can face. Yet Weirkote makes it easy.

You can bead it, crimp it, twist it, draw it, work it to the limits of the steel itself. Doesn't matter what the job or how demanding it is. Weirkote's continuous process integrates the zinc and the steel so that the most complicated forming operations are made without chipping or peeling.

And *now* Weirkote is treated to inhibit wet storage (white oxide) stain. Your finished product has the enduring anti-rust protection you want it to have. You save yourself a lot of rejects, a lot of annoyance. Your costs, from purchase of Weirkote through end product, are pleasingly low. Your customers get even more value for their money.

Weirkote may help *you* to make an even better product at an even lower cost. For free 12-page booklet of facts and technical data, write to Weirton Steel Company, Department B-9, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

New Materials Handling Ideas from Republic

SAVE TIME AND SPACE, IMPROVE HANDLING, SPEED SHIPPING AND RECEIVING OPERATIONS

THESE REPUBLIC STEEL BOXES ARE SAVING TIME, SPACE, AND MONEY at Kropp Forge Company, Chicago, Illinois, because they were engineered to the requirements of the job.

Kropp wanted a tough, sturdy steel box for shipping forgings to customers. It had to be easy to handle and stack. Republic Materials Handling Specialists worked closely with Kropp's production department in developing the design and construction features best suited to the application.

The boxes are used first on the production line for loading finished forgings. Corrugated steel construction takes the heavy loads in stride. Extra strength and rigidity keep the boxes new looking longer. A smooth steel channel around the top of each box eliminates sharp edges and projections—a safety feature during loading and unloading operations.

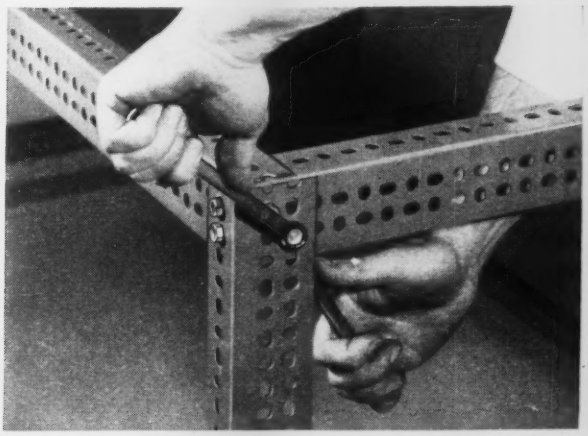
Next, the boxes are picked up by fork truck and placed on carriers for immediate shipment to customers. Or, they may be taken to a storage area for future shipment.

Fork channels with four-way entry provide easy handling in restricted space. Stacking brackets are securely welded to the top corners of each box permitting tiering to any practical height. This feature is a real space saver.

Kropp production men estimate the boxes will last three times as long as the previous type they were using.

Does this spark an idea for your operations? Republic specialists will help you design a special unit or suggest a standard type that could cut costs or simplify an operation. No obligation. Just mail the coupon.

VALUABLE FLOOR SPACE IS SAVED at Kropp Forge with Republic Steel Boxes. Stacking brackets, securely welded at each corner, permit tiering to any practical height. Four-way entry fork channels provide ease of handling in tight quarters.



NEW IDEA MEETS ALL FRAMING NEEDS. It's BILD-A-FLEX, Republic Berger Division's slotted construction angle. Use this versatile, durable product as "metal lumber" for racks, catwalks, scaffolds, special purpose tables and stands. Simply plan your assembly, cut BILD-A-FLEX, join with bolts. Horizontal and vertical slots on ¾" centers make adjustment easy. BILD-A-FLEX is Bonderized and finished with baked enamel after fabrication. Comes in convenient bundles of 10 angles, in .080 gage or .104 gage, 10- or 12-foot lengths, hardware included. Stores in same space as one 2" x 4" piece of lumber. Send the coupon for catalog loaded with ideas.

ANOTHER NEW REPUBLIC IDEA uses steel to protect steel in transit. Corrugated steel gondola car covers, designed and produced by Republic's Berger Division, provide damage-free shipping of coiled steel rolls. The covers afford excellent weather protection, shut out dirt, stop vandalism, eliminate replacement of short-lived tarps. Coil users benefit by eliminating need for paper wrappings on coils. Another cost-saving advantage is the fact that larger coils can be shipped in specially fitted cars. Republic Gondola Car Covers are 22 feet long, 6 feet wide and 6 feet high. Two covers are used with each 52-foot gondola car. Covers are easily handled by overhead or trackside crane. Request that your coil shipments be protected by Republic Coil Covers. Mail coupon today for full facts.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. ST -5491
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Have a Materials Handling Engineer call.
Send more information on:
☐ Materials Handling Equipment
☐ BILD-A-FLEX Construction Angles
☐ Gondola Car Covers

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

UNIVERSAL-CYCLOPS STEEL, EMPIRE, REEVES MERGE

- ***to expand facilities***
- ***widen product range***
- ***excel in quality and service***

Universal-Cyclops, Empire and Reeves . . . three names long synonymous with quality steels and steel products . . . have combined their manufacturing facilities, management skills, and research activities for the benefit of customers, shareholders and employees alike.

The consolidation, establishing Universal-Cyclops Steel Corporation as the parent company and Empire-Reeves Steel Corporation as a wholly-owned subsidiary formed by the union of Empire Steel Corporation and Reeves Steel and Manufacturing Company, results in an operating group prepared to offer new advantages to steel users everywhere.

Accent on quality and service will be a continuing keynote. Combined resources will provide expanded and improved facilities at all present plant locations plus more stainless strip capacity at a new plant in Coshocton, Ohio.

Yes, from top quality carbon, silicon steels, and galvanized sheets to flawless stainless, tool steel, and high temperature metals; from garden-variety steel products to material for jet engines and missiles . . . you can count on Universal-Cyclops and Empire-Reeves to serve its markets and America *better than ever before.*

Universal-Cyclops Steel

CORPORATION

Plants: Bridgeville and Titusville, Pa., and soon in Coshocton, Ohio

Subsidiary plants: Mansfield and Dover, Ohio

CALENDAR
OF MEETINGS

Apr. 14-15, American Society of Mechanical Engineers and American Institute of Plant Engineers: First annual maintenance and plant engineering conference, Penn-Sheraton Hotel, Pittsburgh. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 14-15, American Zinc Institute Inc.: Annual meeting, Chase-Park Plaza Hotel, St. Louis. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive vice president: J. L. Kimberley.

Apr. 14-16, American Institute of Mining, Metallurgical & Petroleum Engineers: Open hearth steel and blast furnace, coke oven, and raw materials conference, Statler Hotel, Cleveland. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: Ernest Kirkendall.

Apr. 14-16, American Management Association: Special west coast general management conference on small business, Ambassador Hotel, Los Angeles. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Apr. 14-17, Design Engineering Show & Conference: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Apr. 14-18, American Welding Society: Welding show and technical meetings, Kiel Auditorium and Statler Hotel, St. Louis. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Apr. 14-18, Steel Shipping Containers Institute Inc.: Annual meeting, Kenilworth Hotel, Miami Beach, Fla. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

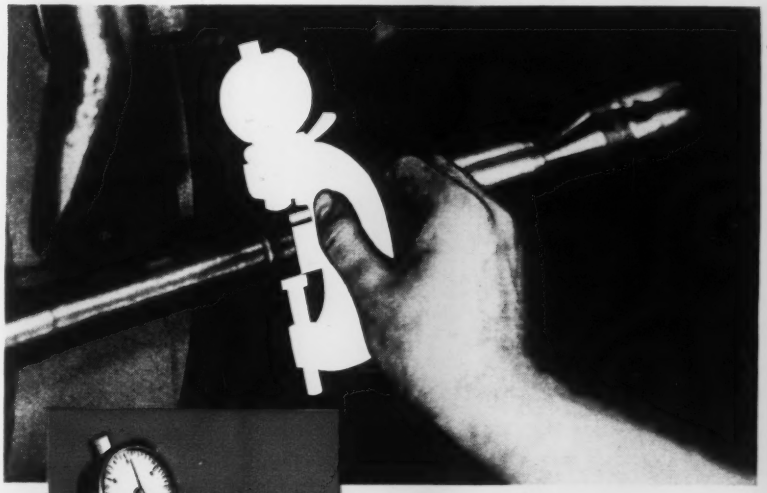
Apr. 15-16, Lead Industries Association: Annual meeting, Chase-Park Plaza Hotel, St. Louis. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Apr. 17-18, American Institute of Steel Construction: National engineering conference, Chase-Park Plaza Hotel, St. Louis. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Apr. 20-24, Scientific Apparatus Makers Association: Annual meeting, El Mirador Hotel, Palm Springs, Calif. Association's address: 20 N. Wacker Dr., Chicago 6, Ill. Executive vice president: Kenneth Andersen.

Apr. 21-23, Association of Iron & Steel Engineers: Spring conference, Dinkler-Tutwiler Hotel, Birmingham. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Apr. 21-23, Building Research Institute: Annual meeting, Shoreham Hotel, Washington. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: William H. Scheick.



Federal Model 1000 P

IF THE GAGE WASN'T THERE...

The only advantage in *not* using a gage at your machine belongs to your competitor! However, like the producer whose job we illustrate, you probably realize that the gage is being used where it can save the most money — as a *productive* tool — weeding out the scrap *before* further handling and machining add *needlessly* to the money you're spending on parts that ultimately will be junked. Not only does this gage indicate if the workpiece is acceptable, but it also shows any trend in dimension so the operator can make the required adjustments to his machine.

True . . . every plant discovers scrap parts before they get to the shipping room (almost always), but the surprising fact is that in so many plants they don't discover the useless parts when it counts most — *before* additional money is wasted on them.

The theory is simple but the choice of just what type of gage to get and just where to use it isn't always obvious . . . not if you want *maximum* results in terms of savings in production costs. That's where Federal comes in. Have a talk with your nearest Federal representative — see if what he suggests might mean real cost savings for you — as it has for so many. The benefit of his specialized experience is gratis and you can be sure that the gages he recommends will tell you accurately and reliably *what* you want to know. They've *earned* that reputation. For more on this subject, ask us for the booklet "Management Blind Spot" — it's worthwhile reading.

FEDERAL PRODUCTS CORPORATION
8214 Eddy Street • Providence 1, R. I.

Ask **FEDERAL** *First*

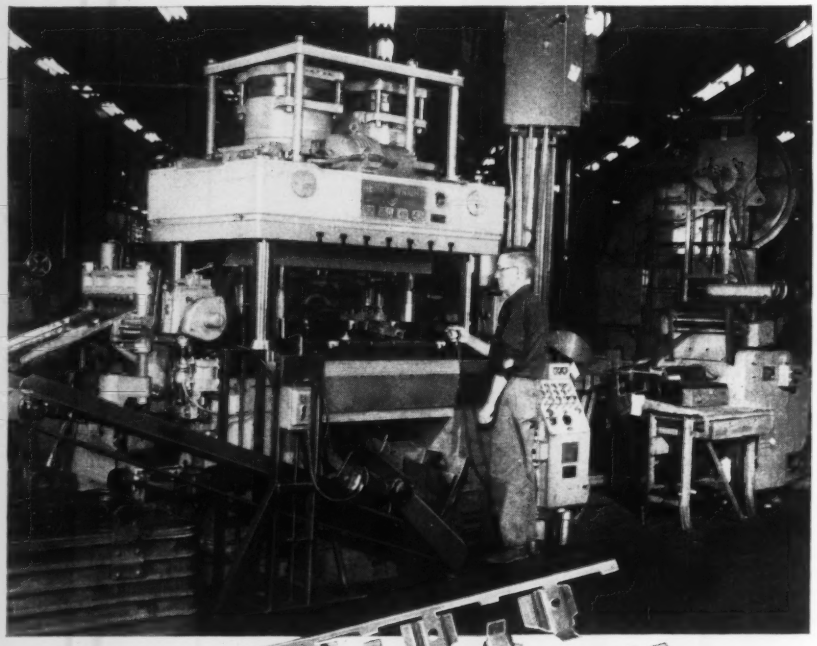
FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic—for Inspecting, Measuring, Sorting, or Automation Gaging

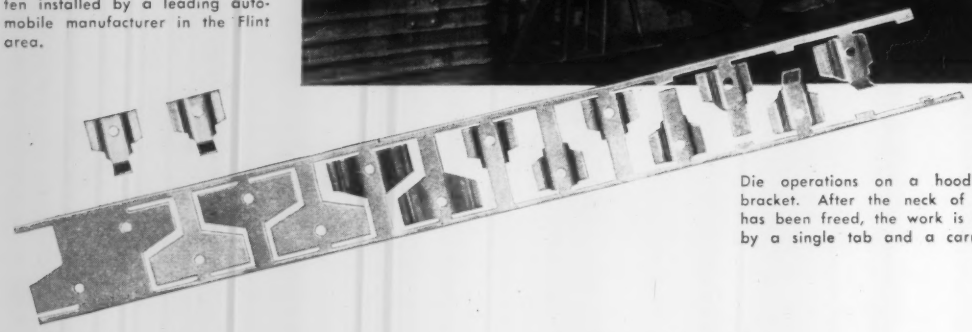
BETTER CARS ARE BEING BUILT

New

Henry & Wright Double-Crank Dieing Machines Produce More Parts Faster . . . More Accurately



150 ton Henry & Wright, one of ten installed by a leading automobile manufacturer in the Flint area.



Die operations on a hood bumper bracket. After the neck of the part has been freed, the work is advanced by a single tab and a carrier strip.

Stamped parts of today's cars must be produced rapidly and in quantity, but they must also be held to close tolerances of accuracy. Henry & Wright machines are now offered in a new double-crank design. The crosshead is supported on both sides of the die so that the tools close in perfect alignment even with severe off-center loads. Thus, parts are more accurate and uniform . . . die life is greatly extended. Because machine design permits quick and easy die change, non-productive time is reduced to a minimum.

Handling more jobs—faster—and to required accuracy tolerances—makes the H & W machines an integral part of automation processes for any plant. These machines are truly the result of "pooled ideas" from the automotive field and from experienced H & W engineers.

Send today, for complete information on these new and proven production profit makers. Build your new production around Henry & Wrights—they're made by H-P-M, you know, a leader in metalworking processes since 1877.

H-804

THE HYDRAULIC PRESS MFG. COMPANY

A DIVISION OF KOEHRING COMPANY • MOUNT GILEAD, OHIO, U.S.A.

WASHBURN
Phosphate Coated
MUSIC WIRE

. . . especially merits your careful investigation if you are interested in superior uniformity of PHYSICALS. This wire amazes the Spring Manufacturer when he tries it on his most difficult jobs.

A trial order will convince you.

108

WASHBURN WIRE COMPANY NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

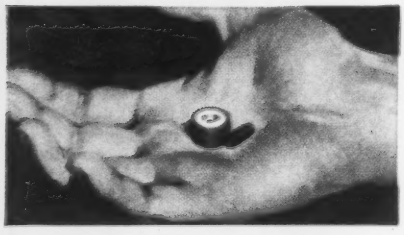
During 1957 the diamonds processed by Norton for industrial purposes were far greater,

How diamonds...
become Industry's

List Price $32,540 — and well worth it! This Norton diamond wheel, built for a prominent ceramics manufacturer, precision-grinds extremely hard parts. Its ability to last so much longer and grind so much better than other wheels more than justifies its first cost.

Your safeguard in buying diamond wheels is Norton leadership in their development and manufacture

Norton was first to introduce bonded diamond wheels . . . all three types: resinoid, metal and vitrified . . . does all its own checking and sizing of diamonds . . . certifies the diamond content . . . duplicates wheel specifications with consistent accuracy . . . brings you a complete line, covering every application.



For Internal Grinding
Norton makes these smallest diamond wheels, together with every other size and type required for surface or cylindrical grinding, sharpening, sawing or cutting-off. And each wheel has the long-lasting excellence that assures the user steady profits.

in number and in total carat weight, than were available as gem diamonds in the U. S.

mined or man-made...

Crown Jewels

This leadership, firmly established by producing the finest cutting diamond wheels, began when only natural diamonds, known as bort, were available for industrial use. In 1930, Norton was first in this country to make, and in 1934 first to sell, successfully developed bonded diamond wheels.

And today, similar pioneering by Norton is assured in the processing of grinding wheels using diamonds, mined or man-made. That is why Norton diamond wheels continue to live up to their long-established reputations for exceptional value.

And that is why they are recognized as the *Crown Jewels* of industry — not only for familiar grinding operations on carbides, ceramics, stone and glass, but for solving the grinding problems of new metals, alloys and materials. Your Norton Abrasive Engineer or Norton Distributor will be glad to give you prompt service and additional facts about diamond wheels. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

NORTON

ABRASIVES

NORTON PRODUCTS

Abrasives • Grinding Wheels • Grinding Machines • Refractories

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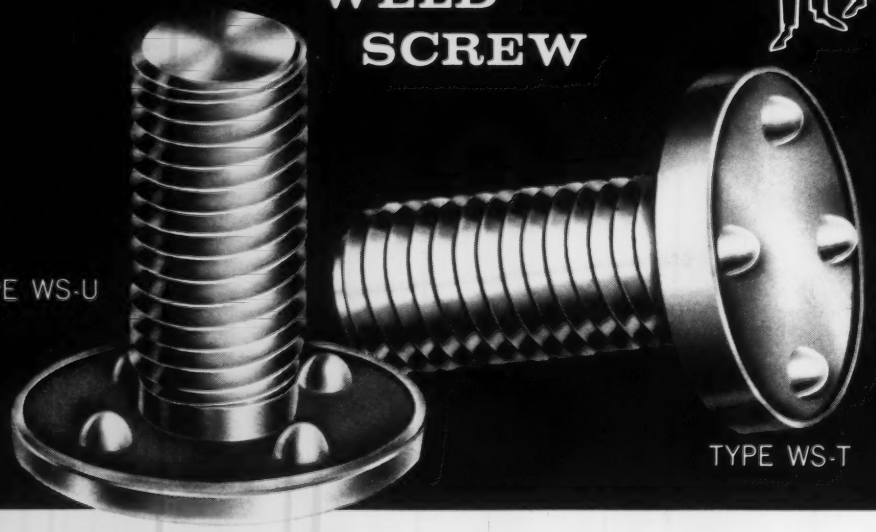
Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Making better products...to make your products better

NOW . . . FOR THE FIRST TIME . . . YOU CAN GET
WELD SCREWS THROUGH YOUR INDUSTRIAL DISTRIBUTOR!

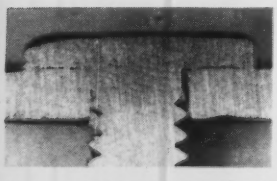
No more waiting for shipments—no need for large, in-plant inventory. Your Industrial Distributor has new, improved P-K Weld Screws. He can serve you promptly, any time and in any quantity, large or small.

for stronger, neater fastenings . . .
the new **P-K® RIMGUARD* WELD SCREW**

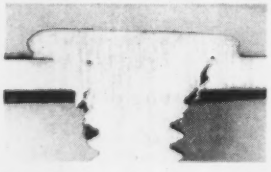


NEW . . . RIMGUARD controls and guards quality of the weld. Rim construction limits amount of pressure that may be applied during fusion—reduces amount of current required—minimizes burning or discoloration—substantially minimizes "spatter" and "flash".

NEW . . . 4-PROJECTIONS assure proper weld area necessary to develop the full strength of the fastening. P-K® Rimguard Weld Screws are available with projections on top of head (Type WS-T) or with projections under the head (Type WS-U).



RIMGUARD weld screw—Observe the complete contact of the head of the screw with the work. This is doubly important where work is to be porcelainized or enameled.



ORDINARY weld screw—Since fusion is uncontrolled, weld is not uniform. Note the possibility of corrosion due to moisture condensation in space between head and work.

Ask your P-K Distributor for samples and complete information, or write Parker-Kalon direct.

PARKER-KALON® Rimguard* weld screws

PARKER-KALON DIVISION, General American Transportation Corporation, Clifton, New Jersey

See the Rimguard Weld Screw in P-K's Booth #739—at the Design Engineering Show—Chicago—April 14-17. *Patent Pending.

Master mechanics like the Wean "Flying Press" as much as presidents do

The Wean "Flying Press" does one thing extremely well: it produces stamped parts at absurdly low costs per piece. This pleases management because the cost reduction it makes possible helps widen the profit spread in finished products.

To find the reason for the master mechanic's satisfaction, we must examine the operating characteristics of the "Flying Press," a difficult job to do in print. First, the "Flying Press" is completely unique among stamping presses, producing parts from coil without stop-and-go indexing at the press. But, far from making the equipment *more* difficult to operate, this "Flying Press" principle eliminates the use of clutch, brake, or fly-wheel; all points of potential press break-down! And there's less danger of die breakage with the "Flying Press," both during set-up and operation, since automatic devices to protect the tooling are built-in.

We could go on with a list of many other advantages which the Wean "Flying Press" offers over ordinary designs, but there's just too much to cover. However, we have summarized the general points of superiority in a booklet which we'll gladly send you. If you'd prefer, one of our sales engineers will be glad to discuss the "Flying Press" in regard to your specific production at your convenience.

May we hear from you, to send the booklet or call?

WEAN

WEAN EQUIPMENT CORPORATION

CLEVELAND 17, OHIO

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PLANING + MILLING

of Heavy Workpieces in one set-up . . . on one machine

- Reduces machining time
- Reduces set-up time
- Increases over-all accuracy
- Cuts manufacturing costs

Write for details

Waldrich Siegen combined planing and milling machines

WALDRICH SIEGEN

american waldrich mfg. corp.

1232 PENN AVENUE, PITTSBURGH 22, PENNSYLVANIA

See why Tool Engineers call these heavy producers,

"MOST MODERN MACHINES OF THEIR TYPE"

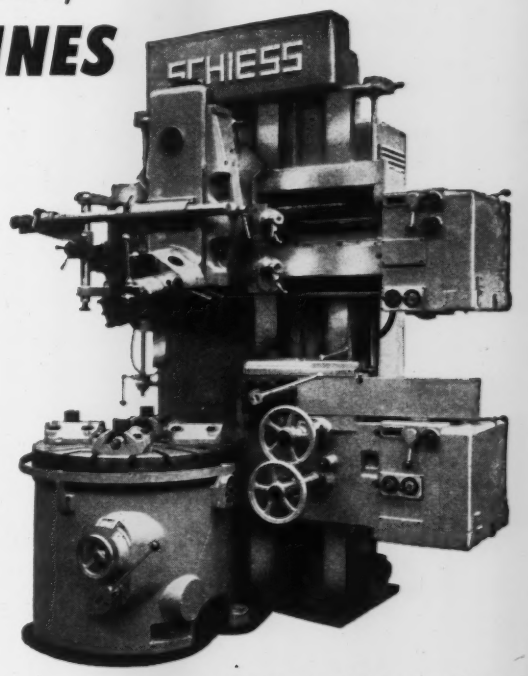
Hydraulic pre-selection of speeds set by handwheel and read on illuminated dial. 16 spindle speeds—ratio 1:50—up to 310 rpm for carbide machining on Model KE 100. Table runs on tapered roller bearings.

Fingertip control for direction of feed and rapid traverse with spring-loaded mono-levers for normal direction plus angular compound feeds. Mono-levers move in same direction as desired feed or traverse movement, simplify correct setting by operator. Specially designed electro-magnetic disc clutches disengage feed instantly with no over-riding or coasting.

Counterbalanced cross rail and side head. Single lever unlocks, raises or lowers, and locks cross rail simultaneously by electro-mechanical controls. *No bolts or nuts to loosen or tighten by hand.*

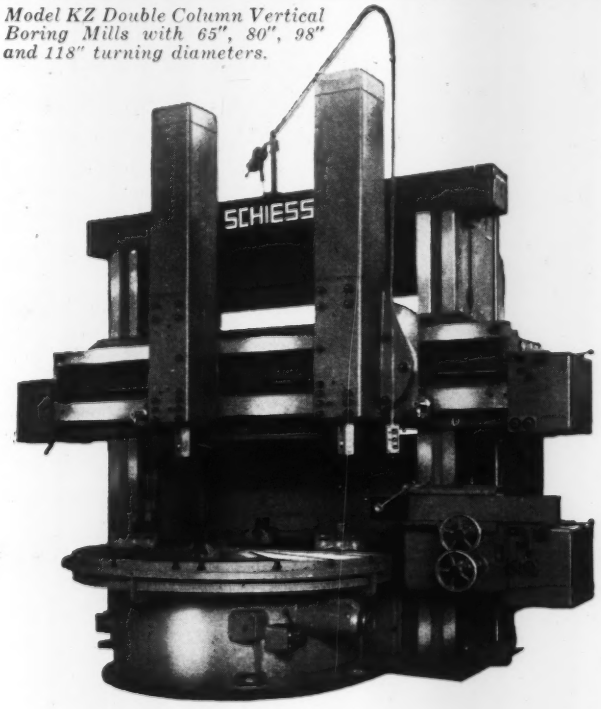
Magnetic dry particle clutch provides vibration-free drive for smooth surface finish. Power is transmitted via belt to clutch from main motor mounted on left side of machine. Instantaneous braking is assured by magnetic dry disc brake.

Copying attachment with electric tracer for use on cross rail or side head.



Model KE Single Column Vertical Turret Lathes with 40", 50" and 65" turning diameters for high-speed carbide machining.

Model KZ Double Column Vertical Boring Mills with 65", 80", 98" and 118" turning diameters.



All operating features of KE Series Vertical Turret Lathes are combined in

SCHIESS KZ DOUBLE COLUMN VERTICAL BORING MILLS, PLUS—

Heads equipped with steel octagon rams can be swiveled—have automatic feed in vertical, horizontal and angular direction and are independent of one another as to amounts and direction of feed. Table operated by three-button pendant control. Standard model KZ Double Column Vertical Boring Mills are available with 65", 80", 98" and 118" turning diameters.

Get to know these products of Europe's largest builder of heavy machine tools. Parts and service are as close as Pittsburgh. An American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on these and all Schiess KE machines.

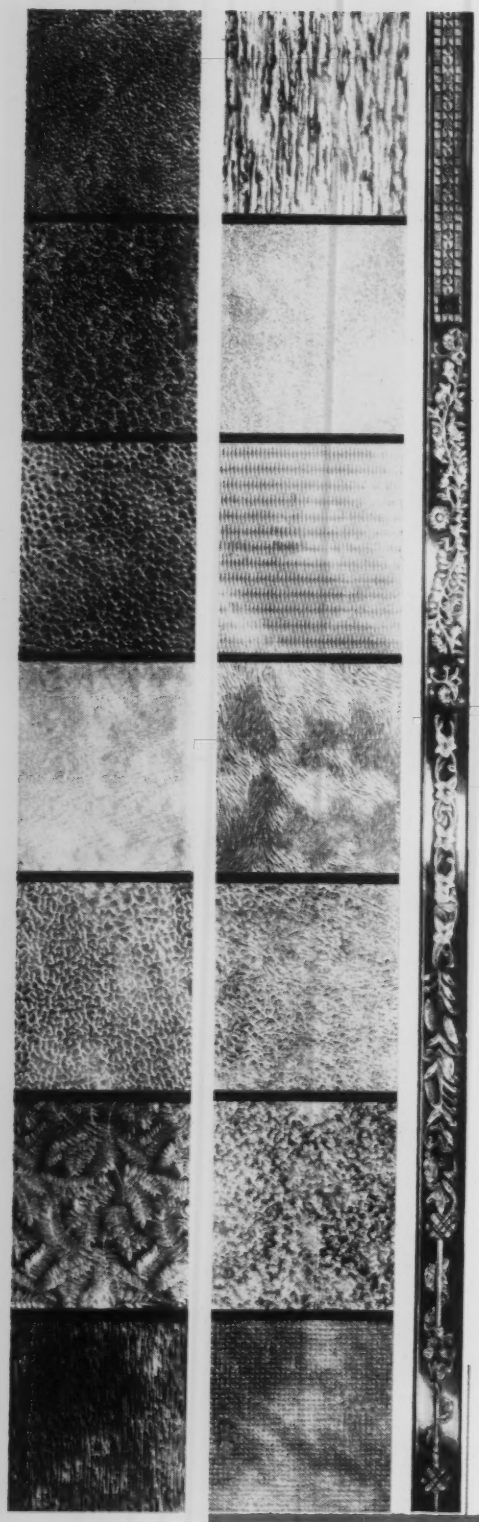
engineering division

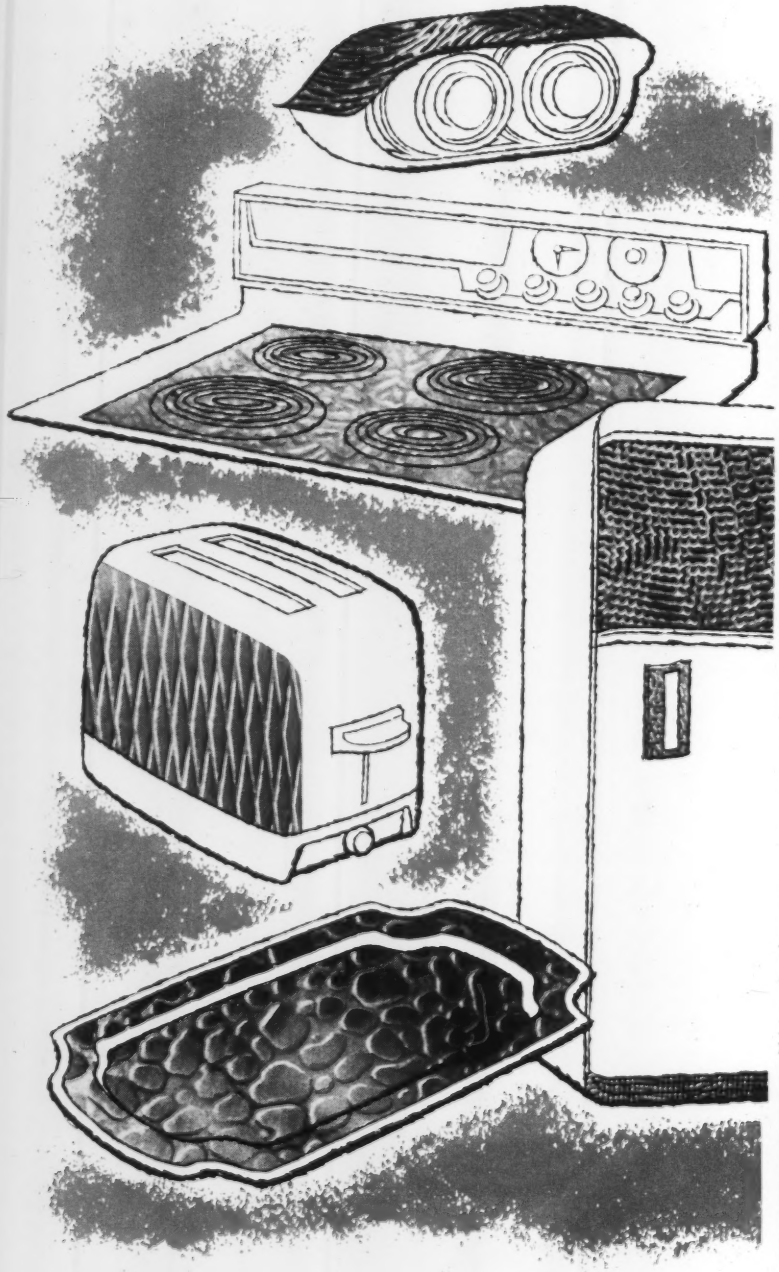
SCHIESS

AMERICAN SCHIESS CORPORATION

1232 Penn Avenue, Pittsburgh 22, Pa.

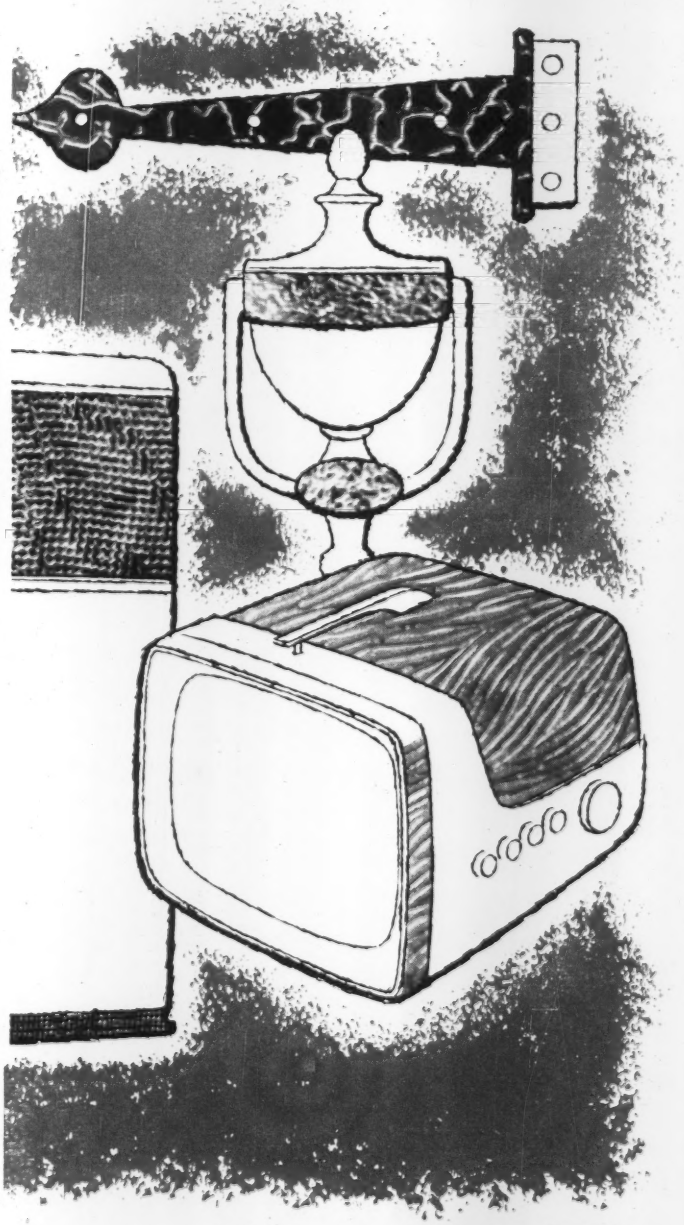
New way to





New patterns . . . Here are 19 new embossed Amerstrip patterns. They can be used on any consumer product made of strip steel, such as: escutcheons, hinges, door knockers, TV and radio cabinets, lamps, table tops, trays, dashboards and kick panels, small appliances, and large appliances.

add beauty and "sell" to consumer products



. . . embossed USS Amerstrip

HERE are just a few examples of the way in which embossed Amerstrip steel can enhance the beauty—and salability—of products made with strip steel. And this is *permanent* beauty . . . beauty you add to your consumer products at low cost.

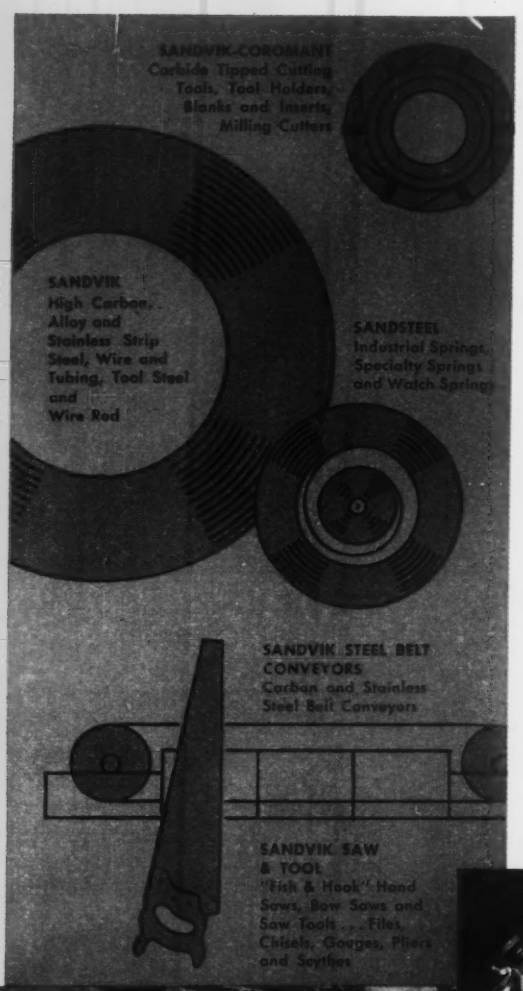
New embossed Amerstrip is an inexpensive way to add charm and distinction to products because you do not have to apply the pattern; the designs are etched on rolls, then pressed into the strip at our strip mill. Once these patterns are applied, they cannot come off; they are permanently rolled into the steel. A wide variety of new patterns are now at your disposal. Embossed Amerstrip has been experimentally fabricated into products to prove that cold drawing does not affect the pattern. It actually draws easier because the pattern helps hold the lubricant.

Embossed Amerstrip has any number of possible applications, including automobile trim, appliances, hardware, and furniture. New embossed Amerstrip—like all types of Amerstrip—is made to meet the standards of highest quality. American Steel & Wire Division has a large, competent technical staff to help you select the embossed Amerstrip your product needs. Put extra beauty—and customer appeal—in your product with embossed Amerstrip Cold Rolled Strip Steel. For full information, call our nearest sales office. American Steel & Wire, General Offices, Cleveland, Ohio.

USS and Amerstrip are registered trademarks

American Steel & Wire
Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad


SANDVIK-COROMANT
Carbide Tipped Cutting Tools, Tool Holders, Blanks and Inserts, Milling Cutters
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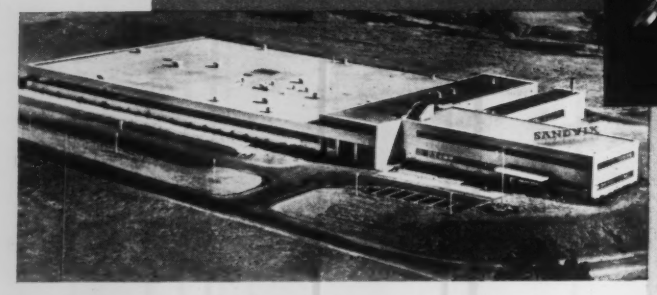
SANDVIK QUALITY PRODUCTS

Serve Millions Of Americans

In razor blades and refrigerators, in clocks and cars, in hand saws and industrial tools, in chemicals and candy...almost anywhere you look, Americans use Sandvik products.

From coast to coast, Sandvik's consistent product quality and specialized service benefit both industry and the individual consumer. That's the reason why Sandvik has been growing with America since 1878.



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Branch Offices: Cleveland • Detroit • Chicago • Los Angeles

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A 3M Case History Report

33% MORE WELD GRINDING PRODUCTION WITH 3M TYPE "C" ABRASIVE DISCS

MANUFACTURER: American Radiator and Standard Sanitary Corporation

ADDRESS: Buffalo, New York

PRODUCT MANUFACTURED: Heating and plumbing components

3M ABRASIVE USED: Type "C" Abrasive Discs

HOW 3M ABRASIVES ARE USED: Removing excess spot-weld metal from cold rolled steel oil burner housings.

OPERATIONAL DATA ON 3M METHOD: Grit 50 Type "C" Discs, on portable grinders, are used to edge-grind spot-welded areas. Customer tested 3M and competitive discs in own shop by painting over backing to prevent identification, and using discs in actual production.

OPERATIONAL DATA ON PREVIOUS METHOD: A competitive brand of abrasive disc was used for the same operation.

PROVEN ADVANTAGES OF 3M METHOD: Operators ground 48 burner units with 3M Type "C" Discs, compared to 36 with competitive disc—got 33% more production out of the Type "C"

WANT MORE INFORMATION? Send for free manual, "Weld Grinding and Blending". Write to 3M Co., St. Paul 6, Minn., Dept. GJ-48.

"3M" is a registered trade mark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export: 99 Park Ave., N. Y. Canada: London, Ont.

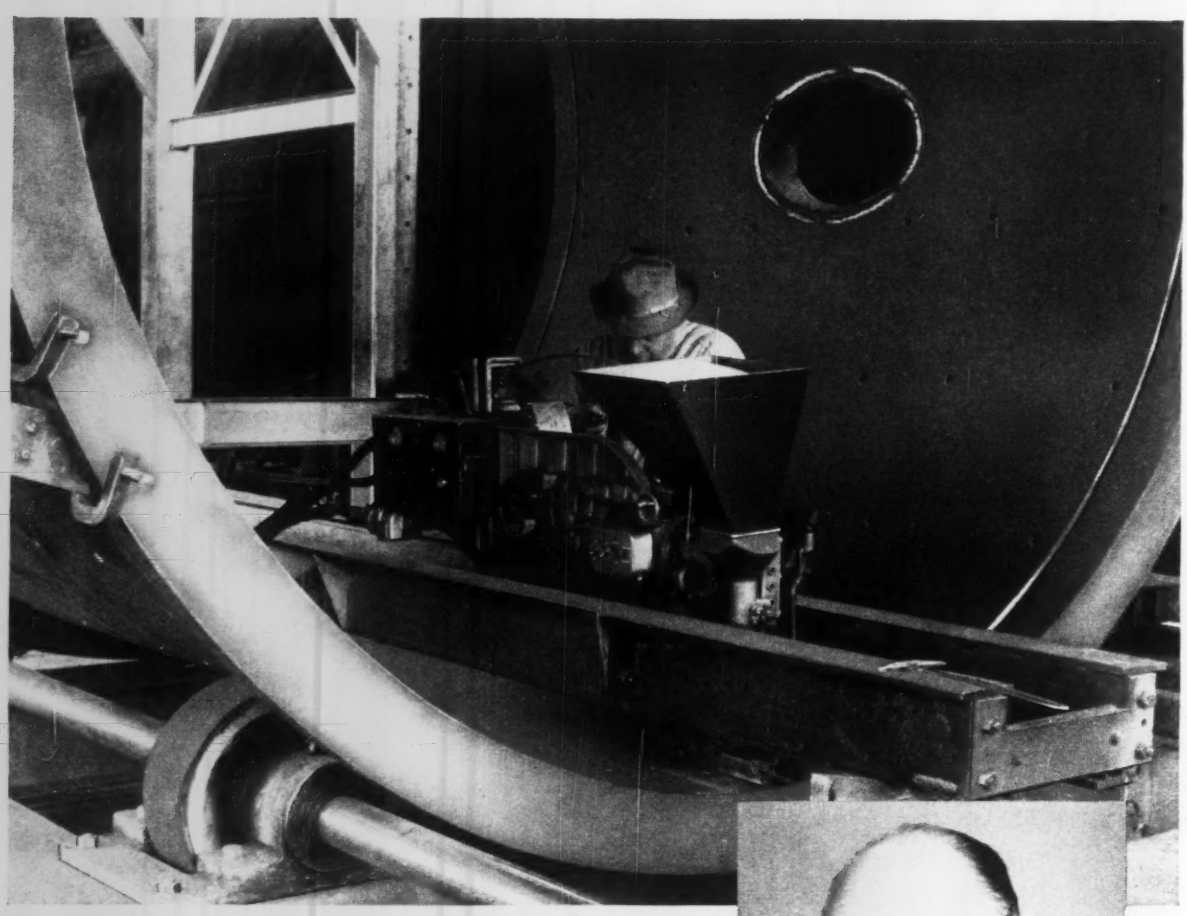
3M Coated Abrasives

TYPE "C" ABRASIVE DISCS

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY



Many of Mine and Smelter's Marcy grinding mills are equipped with Standard Steel flange rings, shown above. No flange ring replacements have ever been required. Some of these mills have been operating 24 hours a day for more than 15 years.

"'Dependability' is the keyword in our very fine relationship with Standard Steel"

We at Standard are happy indeed that Mine & Smelter Supply Co.'s chief engineer, J. R. Grout, appreciates the efforts we have gone to over the years to combine dependable service with our know-how and quality standards.

We consider it our responsibility to help maintain the world-wide reputation for quality mining and industrial equipment which Mine & Smelter Co.'s Marcy Mill Division enjoys by providing this customer with the same fine service it renders, in turn, to *its* customers.

Won't you discuss your needs for weldless rings, flanges, forgings and castings with us. You will appreciate our personalized service. Write Dept. 2D.

"Standard Steel for many years has been supplying our company with shell flange rings, as well as riding and roller tires for use on our Marcy Grinding Mills and other rotary-type equipment. Their product quality and cooperation have helped make it possible for us to serve our customers promptly—our company policy. I believe the word 'dependability' is the keyword in our very fine relationship with Standard Steel," says Joseph R. Grout, chief engineer, Marcy Mill Division, Mine & Smelter Supply Co.

Standard Steel Works Division

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Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

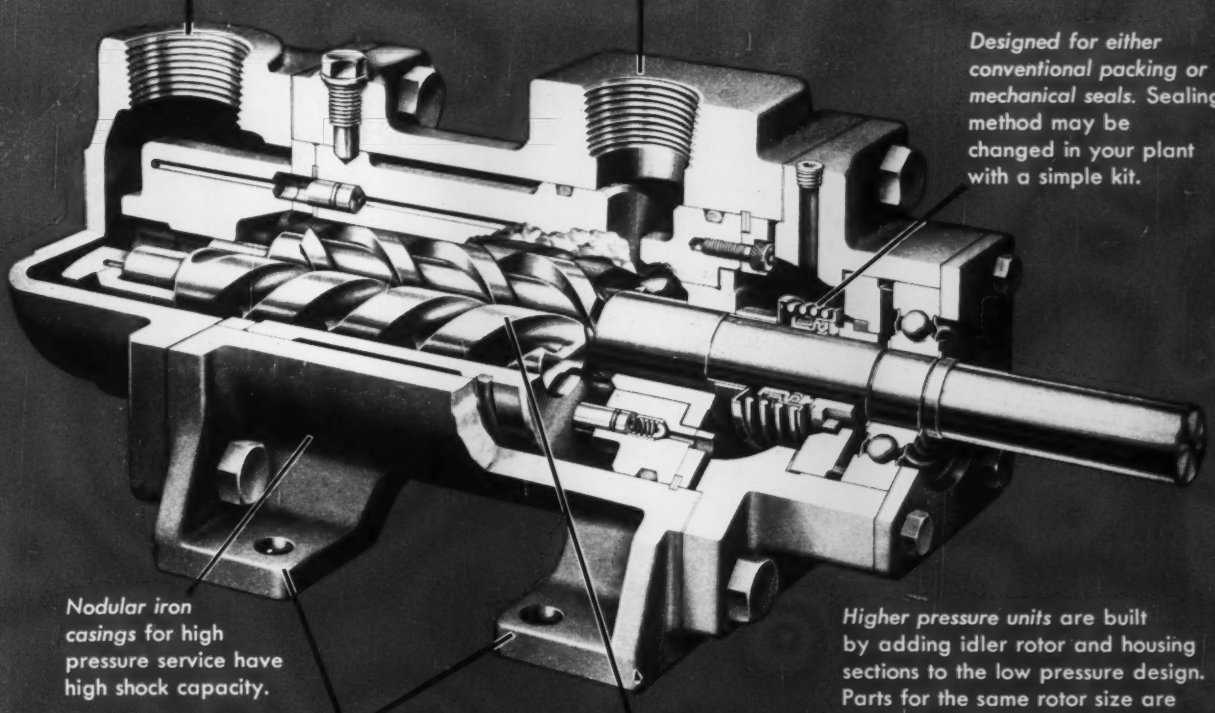
DE LAVAL IMO PUMPS

are now more versatile than ever

De Laval IMO pumps have proved that they do a dependable job over long years of service. The reason is IMO design simplicity. These constant displacement rotary pumps have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no timing gears, cams, valves, sliding vanes, or reciprocating parts to wear or become noisy. *Quiet*, compact IMO pumps are excellent for direct-connected, high-speed operation.

In addition to these basic pumping advantages, the improved IMO gives you important new benefits shown in the cutaway illustration below.

DE LAVAL IMO PUMPS can also be used as hydraulic motors.



Inlet can be rotated to suit installation arrangement.

Discharge flanges are infinitely varied. You can use the most advantageous piping method to suit installation requirements.

Designed for either conventional packing or mechanical seals. Sealing method may be changed in your plant with a simple kit.

Nodular iron casings for high pressure service have high shock capacity.

Any position mounting is possible without factory modification.

Higher pressure units are built by adding idler rotor and housing sections to the low pressure design. Parts for the same rotor size are interchangeable over the entire pressure range.

Internal parts are designed as a package so that units can be built into your machines.

Bulletin 3001 gives data on improved De Laval IMO pumps. Send for your copy today.

DE LAVAL *IMO Pumps*

DE LAVAL STEAM TURBINE COMPANY

860 Nottingham Way, Trenton 2, New Jersey

DL 415

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

Inexpensive Tooling

The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.

THE WATERBURY FARREL
Foundry & Machine Company
WATERBURY, CONN.

Branch Offices: Chicago • Cleveland • Millburn, N. J.

For further information, write for free bulletin or contact your nearest WF representative, today.

Bolt, Nut & Screw Machinery

Power Presses

Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills & Other Special Machinery

WATERBURY FARREL FOUNDED 1851

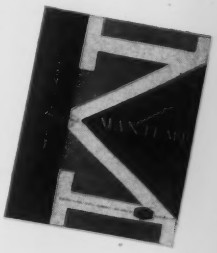
"We've practically eliminated off-grade heats with MANTEMP ferromanganese"

An almost foolproof way to hit open-hearth manganese specifications consistently is with ladle additions of MANTEMP ferromanganese. Mill superintendents have reported that the alloy yields high recoveries and allows substantial reductions in overall ingot costs.

Fine grain size specifications can also be met easily because MANTEMP ferromanganese does not preferentially oxidize separately added aluminum. The alloy is available in both high- and medium-carbon grades, packed in cans containing exactly 40 pounds of manganese.

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

For further information, write for this new six-page MANTEMP ferromanganese bulletin.



Electromet

FERRO-ALLOYS AND METALS

UNION CARBIDE

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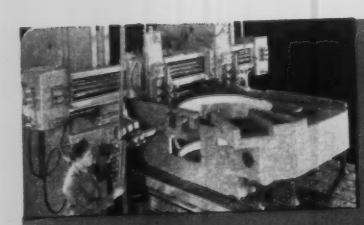
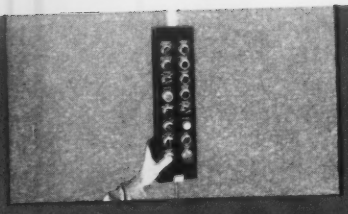
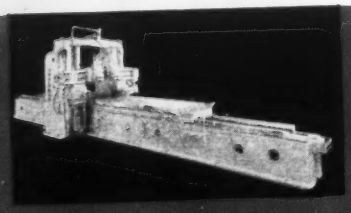
facts about hy-draulic design...



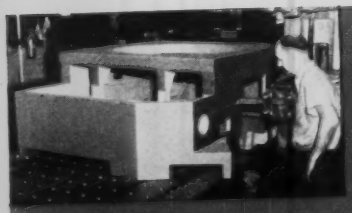
is smooth, powerful, wear-free.



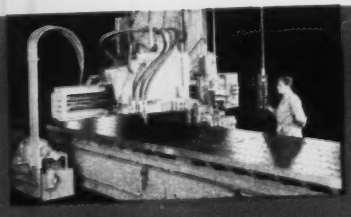
is infinitely controlled, with infinitely variable speeds and pressures.



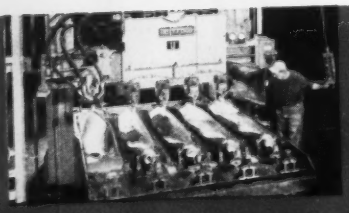
requires minimum maintenance.



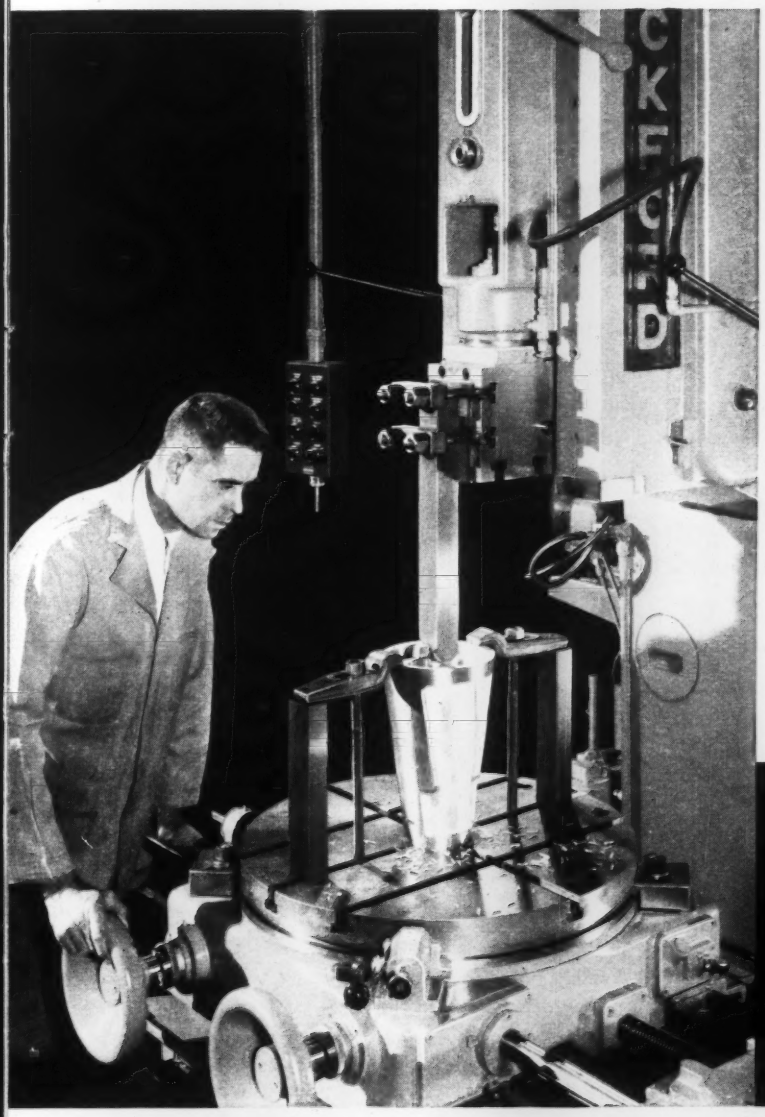
absorbs all shock and overloads, without mechanical or electrical failure.



is simple to operate, designed for overall operator efficiency.

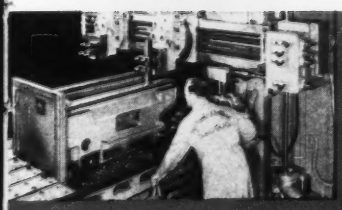


increases tool life, permits instant selection of optimum cutting speeds.

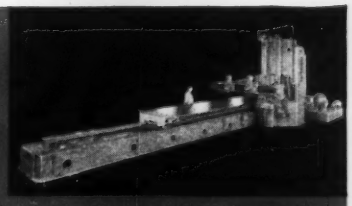


new **hy-draulic slotter** with traveling column

For greater capacity, this machine permits variable relationships between the table and the column.



permits fast, shockless reversals, delivers more strokes per minute.



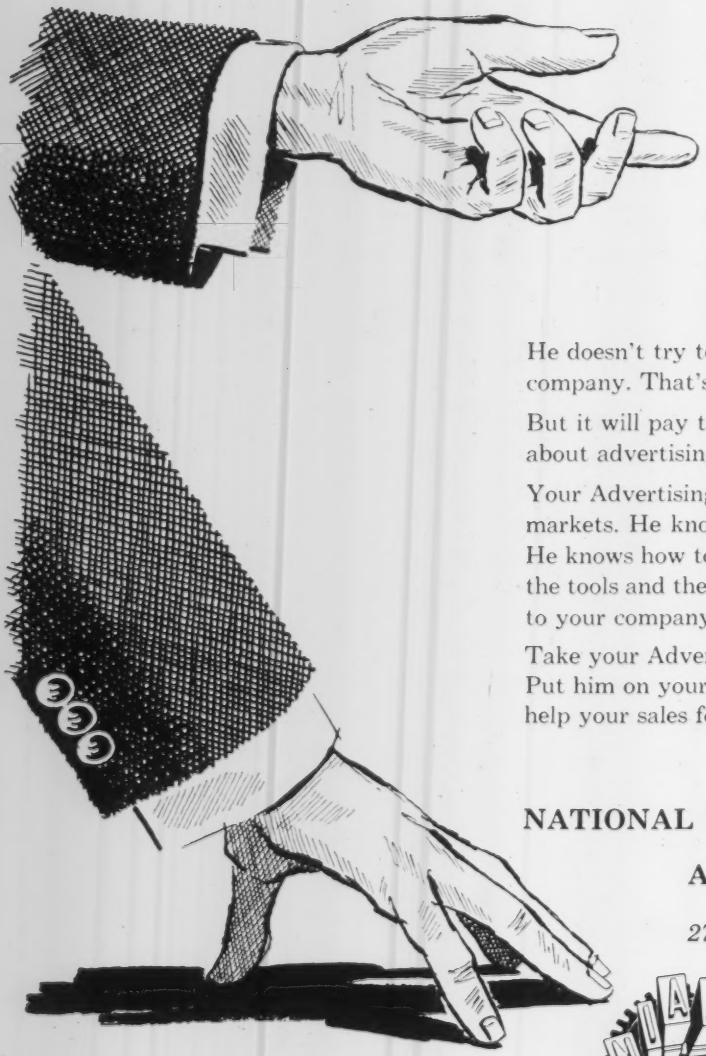
with absence of mechanical parts, provides freedom from wear and chatter, assures maximum accuracy with longer machine life.

...only with hy-draulic design do you get these advantages!

ROCKFORD MACHINE TOOL CO.
2500 Kishwaukee Street • Rockford, Illinois

HYDRAULIC

Does your Board of Directors listen to this man?



He doesn't try to tell your Directors how to run the company. That's their job, and he respects it.

But it will pay them to listen to him when he talks about advertising for your company. That's his job!

Your Advertising Manager is a man who knows markets. He knows the science of "mechanized selling." He knows how to help turn sales goals into sales. He has the tools and the know-how to make major contributions to your company's progress and profit.

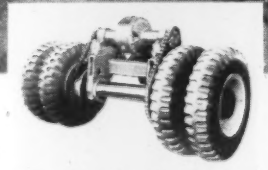
Take your Advertising Manager into your confidence. Put him on your first team. Let him manage. He can help your sales force sell more economically.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

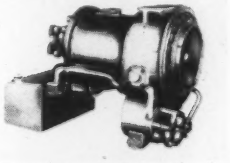
271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

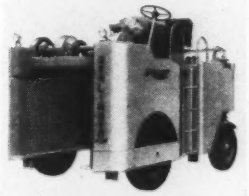
Today's industries need Gerlinger Continuous Operation



Gerlinger Stationary Load Axle carries all dead weight of load—protects differential housing against strain. An exclusive reduction gear prevents axle wear and tear.



Gerlinger Torqmatic Drive safeguards engine from damaging shocks, prevents stalling, eliminates gearshift guess and lessens driver fatigue. Extra operating ease is assured when Gerlinger Power Steering is added.



Gerlinger Material Carriers with capacities up to 60,000 pounds are more popular than ever throughout industry—handling steel, paper, chemicals, timber, lumber and other products for factories, mills and shipping docks.

Give Your BIG Jobs to Gerlinger!

This heavy-duty fork lift truck is loading 30,000 pounds as easily as you move a paperweight. The giant Gerlinger is a pneumatic-tired Model H-40 with the industry's greatest lifting capacity. It is built to handle 20 tons just as smoothly, with maximum savings in handling costs.

Gerlinger *Job-Proved* features make it possible for the operator to do a bigger day's work with less fatigue. Features like pivotal-mounted steering assembly, counter-active weight distribution, instant fingertip lift-tilt control and floating type mast action are some of the advances that put Gerlingers in a class by themselves.

If handling up to 40,000 pounds of products, parts or raw materials is practical in your production operation, don't fail to look at the performance records established by these Gerlinger fork lift trucks. Send for latest published data showing why you get unmatched savings—and require less downtime with far less maintenance cost — through *Gerlinger continuous operation.*

Leaders for 39 years in building Fork Lift Trucks and Carriers

TOWMOTOR THE ONE-MAN-GANG **-GERLINGER***

**Gerlinger Carrier Co., Dallas, Oregon is a subsidiary of Towmotor Corporation, Cleveland, Ohio*

☐ Send free Gerlinger Fork Lift Truck literature with specs

☐ Send free Certified Job Studies relating to our business which is:

Name_____

Company_____

Address_____

Mail to **GERLINGER CARRIER CO.**, Dallas, Oregon

Protection from Metal Splashes

Here it is . . .

AO's New 315 Chipper's Goggle

(Also available in Dust goggle as No. 316 with 150 mesh inner screen set behind a 16 mesh screen)

Engineered Vision and Protection at their best for Chippers, Foundrymen and Others!

This goggle is recommended for protection against impact hazards such as chipping, melting, pouring, grinding, babbitting, riveting, hand tool and machine work. Goggle is regularly supplied with soft *plastic* mask — with leather available. Edges of sponge rubber are bound with corduroy. Super Armorplate clear or Calobar lenses in medium, dark or extra dark shades.

FEATURES . . .

1. Greater Protection — larger face mask
2. Better Vision — 57.8 mm. wide vision lenses instead of the former 50 mm. round lenses
3. Increased (double) Ventilation — 40 mesh screen
4. Perfect Fit — Over all types of spectacle glasses. One-piece, easily adjustable rubber headband "clips" through metal frame instead of mask — assures maintained closer fitting
5. Standard screw endpieces

Quality costs no more! Always insist on the AO Trademark. Your nearest American Optical Safety Products Representative can supply you.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS
Branches in Principal Cities

... Results of a Superior Beginning

The countless parts and products made from Roebling high-carbon steel spring wire and flat spring steel have one thing in common . . . their superior quality. This, of course, is related to the inherent fineness of the materials.

The variety in which Roebling offers these spring materials is equally impressive. They are available in hard drawn, hard rolled, annealed or soft, tempered or untempered. Types include zigzag and no-sag wires; upholstery and mechanical spring wires; valve spring wire; clock- and motor-type spring steels and flat spring steels of all types and description.

Whatever the type, size or characteristics you require—Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities—Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Announcing!

new

CHICAGO
DREIS & KRUMP

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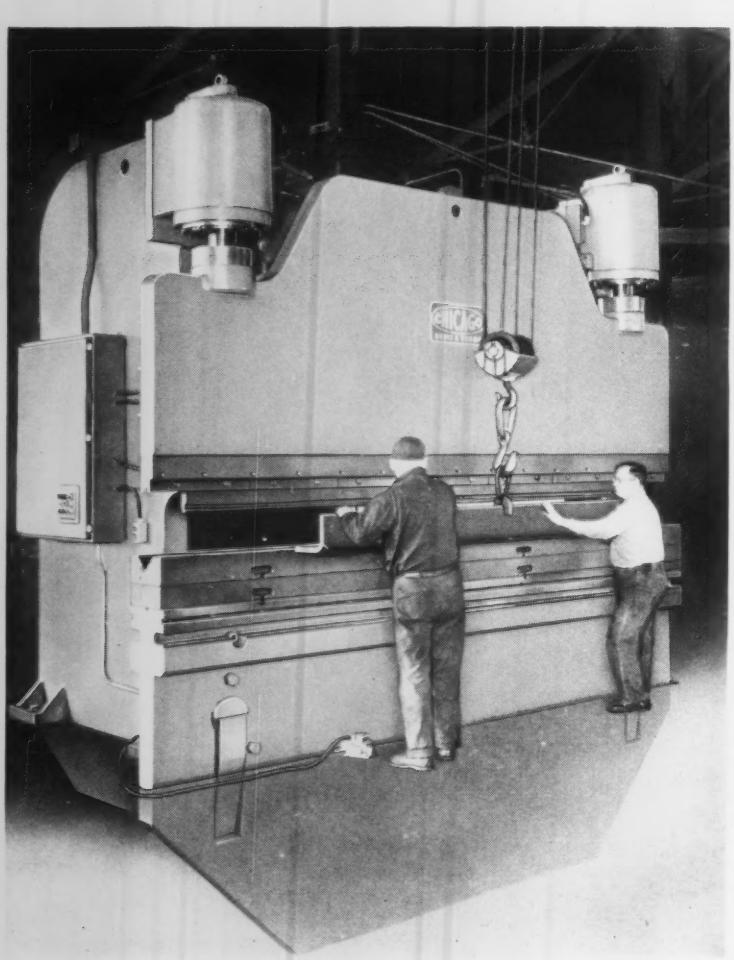

Capacities 300 to 2000 Tons

- New - Improved Sensitive Level Control
- Variable Ram Speeds Pressing - Return
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- Range
- Accuracy
- Precision Construction

Complete details or recommendations for any job on request

Press Brakes · Press Brake Dies · Straight-Side-Type Presses · Hand and Power Bending Brakes · Special Metal-Forming Machines

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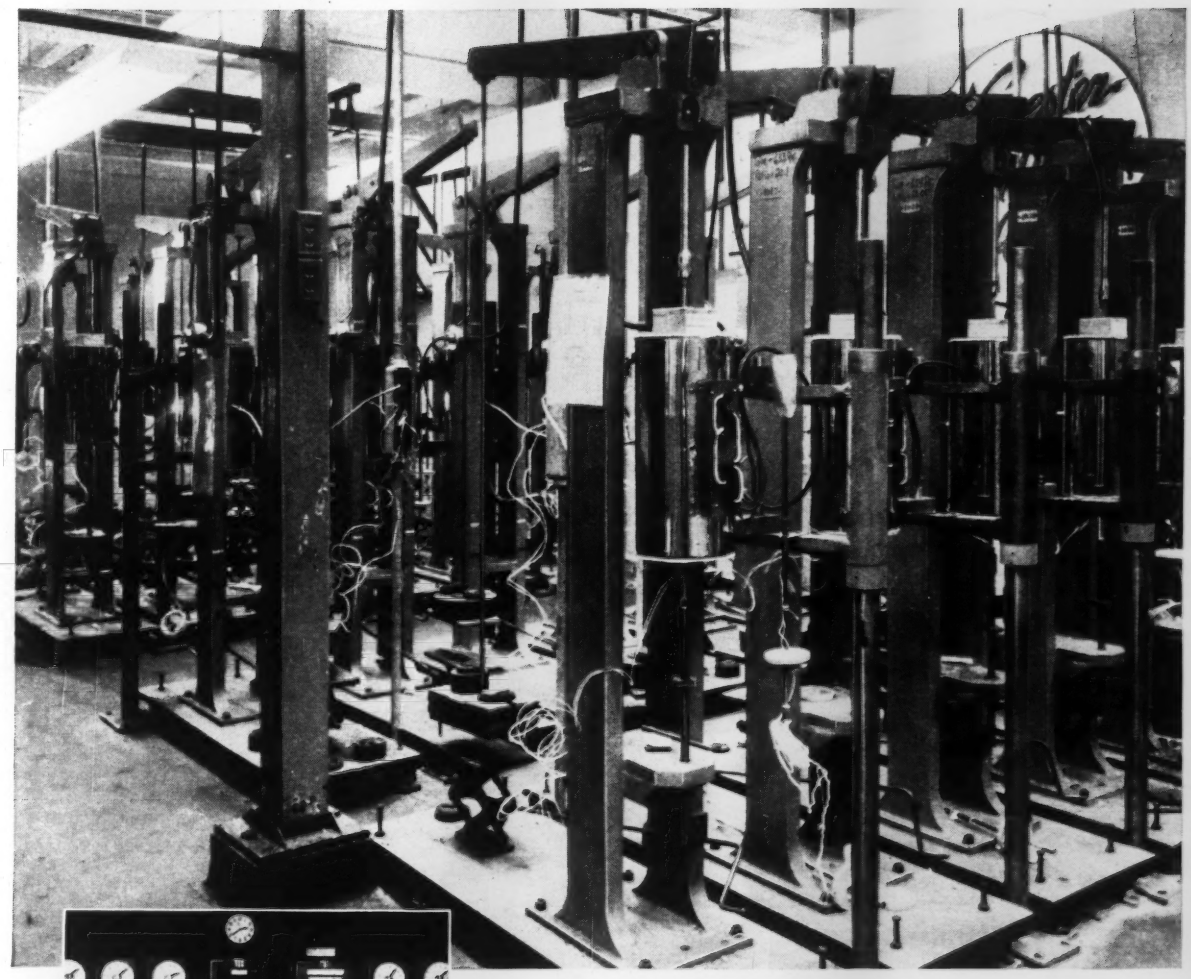
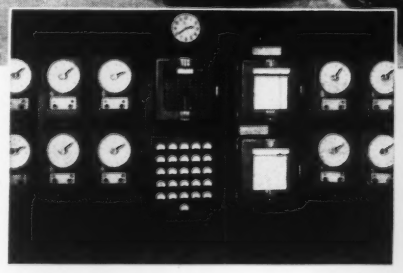




41 Speedomax® H Controllers Reduce Overshoot . . . Speed Recovery on Creep Rupture Machines

Here are only some of the creep rupture machines and Speedomax controllers at Wyman-Gordon, Worcester, Mass. To meet government specs for jet plane forgings made of titanium and special alloy steels, Wyman-Gordon has installed 2 banks of creep rupture testing furnaces with space-saving Speedomax H proportioning control. This combination assures them of quality control on a production basis . . . permits them to turn out part after part which will meet the stresses induced in jet propelled aircraft.

To keep production moving, Speedomax H D.A.T. control enables operators to bring furnaces up to temperature in minimum time. Rate of approach, in most cases, eliminates overshoot . . . speeds recovery time after sample change. By continuously regulating heat input in proportion to furnace needs, this Speedomax H control holds temperature of furnaces within ±2 F and in addition, eliminates the need for manually readjusting auto transformers.

Additional instrumentation includes four multiple-point Speedomax G recorders for each bank of furnaces, and 80-point and 76-point Model D Speedomax G indicators for checking furnace temperatures at any time from a central location.

Why not investigate Speedomax H when installing your next heat treating furnace—whether it's electric or fuel-fired, continuous or batch. A phone call or letter to your nearest L&N office —or to 4957 Stenton Ave., Phila. 44, Pa.—will bring you more information.

LEEDS Instruments NORTHRUP Automatic Controls • Furnaces

Any tapped or drilled
a Gold Mine of $avings
. . . when you use

MORSE

Electrolized Tools

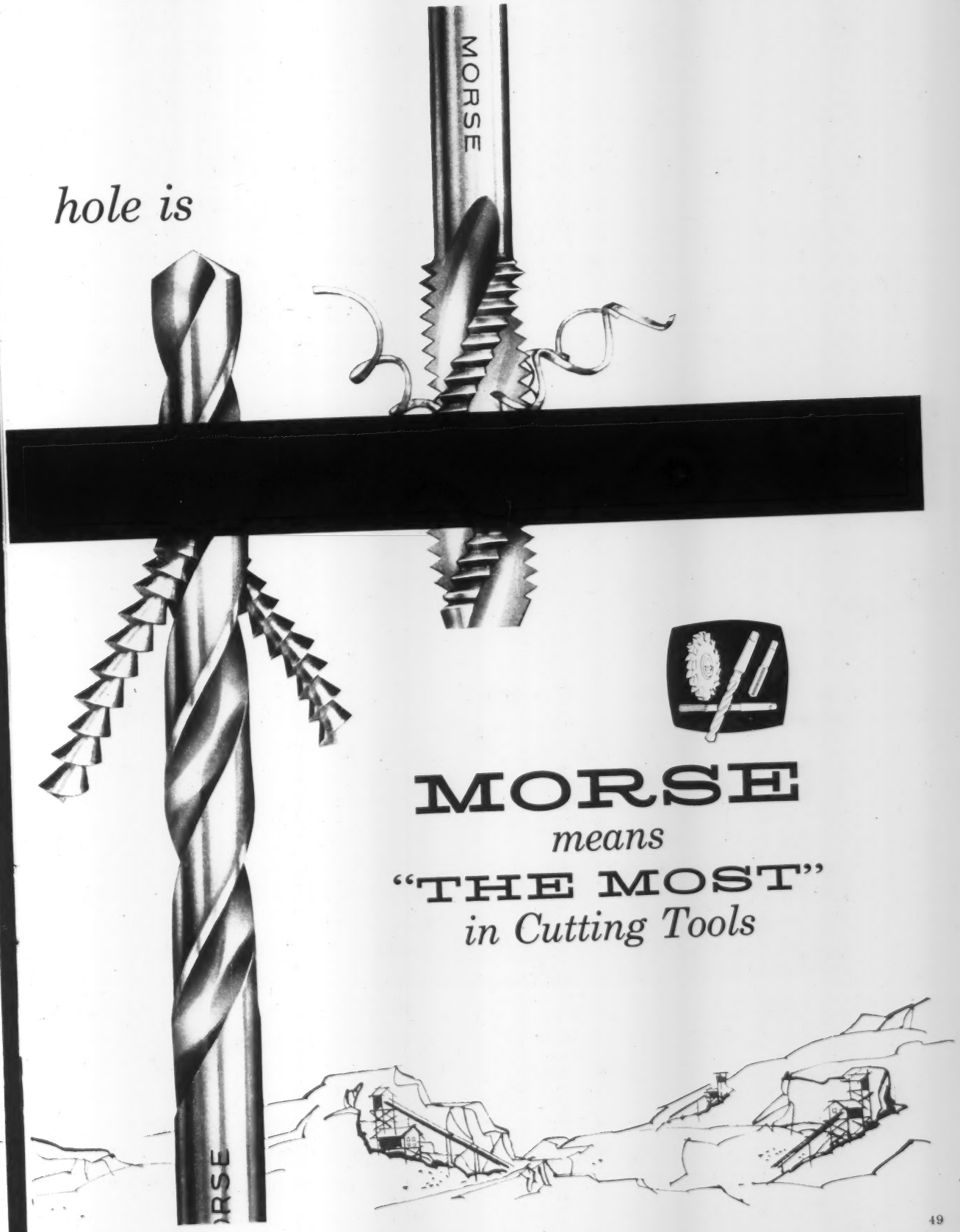
This exclusive Morse process *penetrates the metal*, and becomes part of its atom-structure . . . puts extra durability under skin of the cutting tool.

That's why so many cost-conscious buyers specify Morse *Electrolized* Tools . . . because they know it's the only way to get as much as 100% longer tool life, with every hole cleanly and precisely cut.

Proof? All you have to do is ask your Morse-Franchised Distributor.

MORSE TWIST DRILL & MACHINE CO.
NEW BEDFORD, MASS.
A Division of VAN NORMAN INDUSTRIES, INC.
Warehouses in
New York, Chicago, Detroit, Dallas, San Francisco

hole is

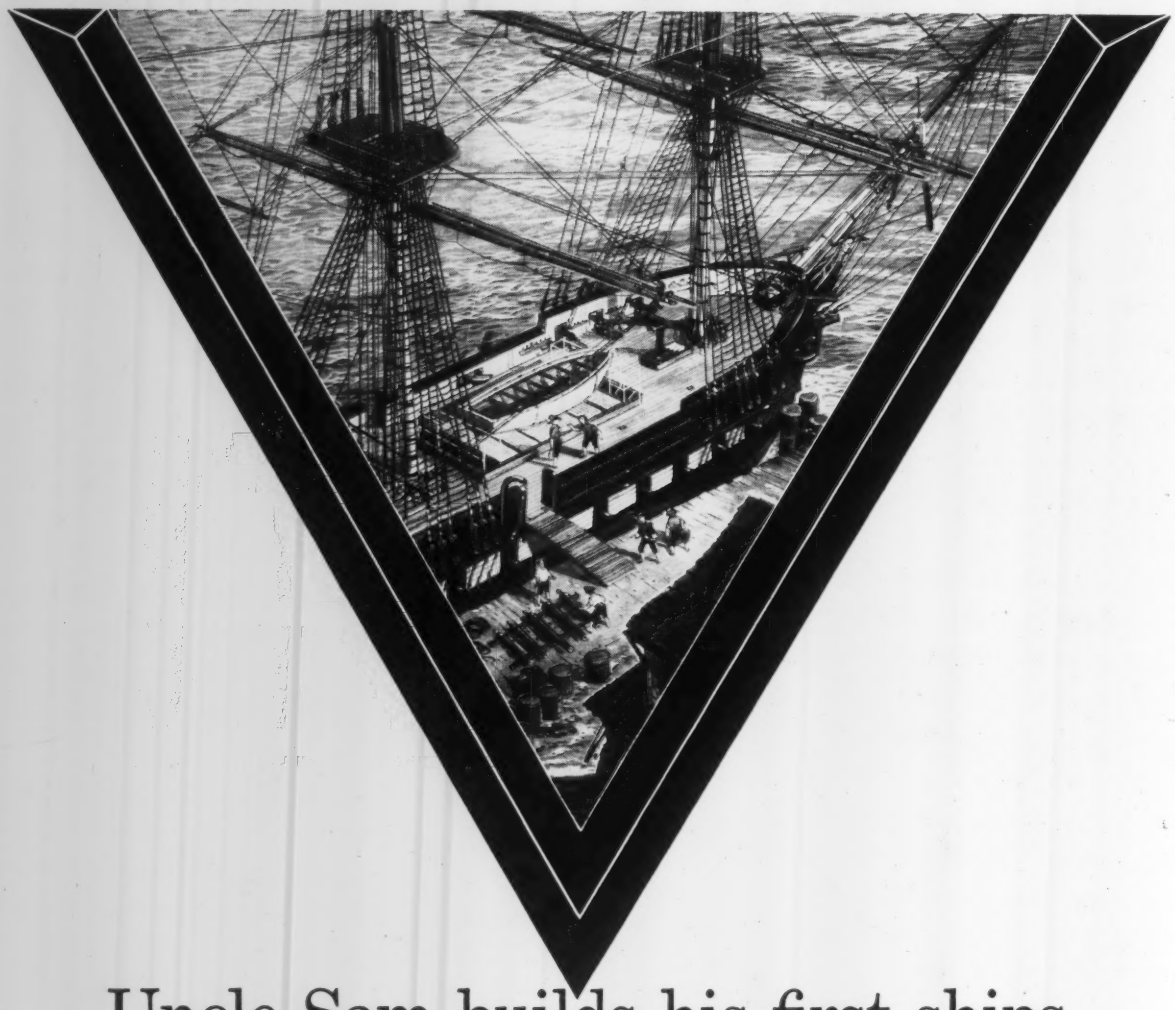


MORSE

means

"THE MOST"

in Cutting Tools



Uncle Sam builds his first ships

and marks a fine deep-water plant site

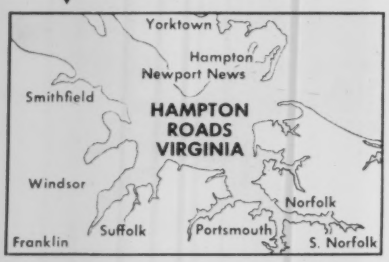
"Don't give up the ship!" Captain Lawrence's brave last command keeps alive memory of the frigate *Chesapeake* . . . one of the first warships ordered by the young U.S. Government. Her launching in 1799 led to creation of Norfolk Naval Shipyard in Portsmouth . . . birthplace of many a famous ship, from the Confederate ironclad *Virginia* to the *Langley*, first U.S. aircraft carrier.

Today, on the shores of Hampton Roads, ship building is just one of many industries that profit by this strategic deep-water location. Amoco, and Lipton Tea, for example, are two of the newcomers to swell this area's yearly output of more than $680,000,000.

If your new plant needs deep water, you'll find plenty of advantages here to go with it. Nine main line railroads, 45 truck lines, five major airlines, and 100 ship lines give you top transportation. Coal, timber and other raw materials are nearby. There's natural gas on tap. And abundant electric power flows from Vepco's growing network . . . now adding 640,000 kilowatts of capability to reach a 2,171,900 kw total by 1960.

For more facts, or confidential site-finding help, contact Vepco . . . serving the "Top of the South" in Virginia, West Virginia and North Carolina.

HAMPTON ROADS
VIRGINIA



VIRGINIA ELECTRIC and POWER COMPANY

Clark P. Spellman, Director—Area Development, Electric Building, Richmond 9, Virginia • Phone: MIlton 9-1411

AMBALLOY...A. M. BYERS ELECTRIC FURNACE QUALITY STEEL PRODUCTS

STEEL PLATES...AT SIZES AND STRENGTHS TO SUIT YOUR NEEDS

Have a plate problem?

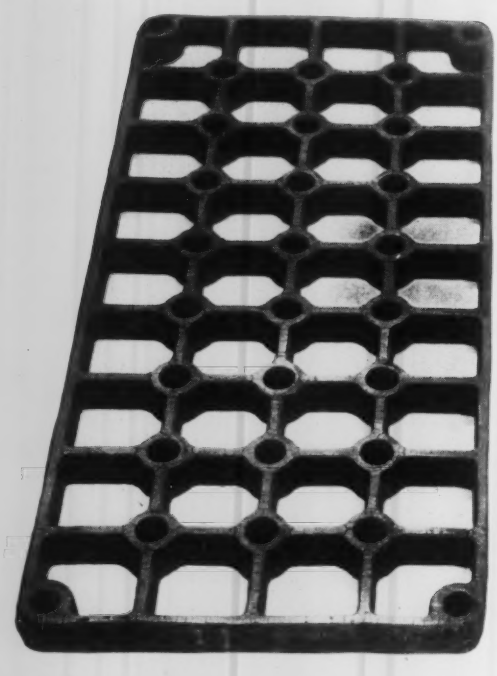
Tell us what it is. Let us know what you need in the way of structural quality, wear resistance, or special alloy composition. Then leave the rest to Byers.

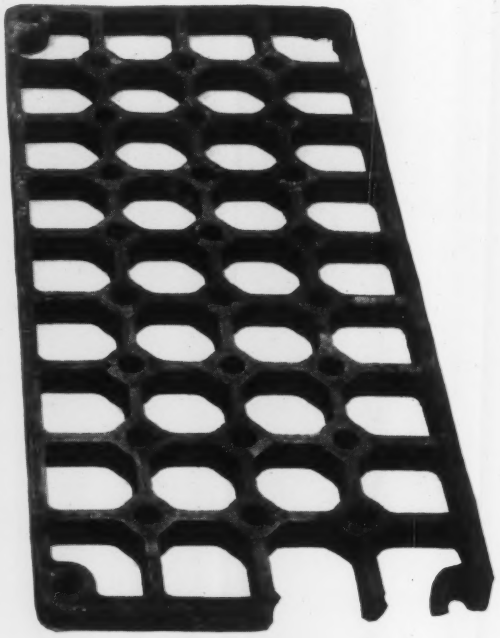
We'll speed your order from mill to job site, with special attention to your deadline commitments. Various grades of Byers carbon, alloy and stainless steel plates, with the AMBALLOY stamp of quality, wear well in ships, trucks, railroad cars, automobiles, agricultural tools, conveyor and mining equipment. There's a list as long as your arm.

Cost control and an ever-increasing range of plate sizes make us competitive on any order. Write or call us—today—for the name of the Byers metallurgist nearest you. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

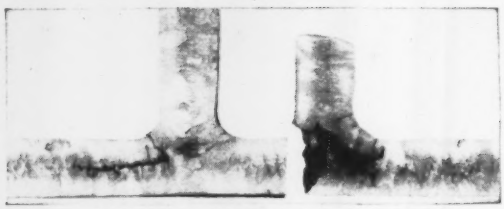
A growth company with the emphasis on quality and service **A. M. BYERS COMPANY**

THE TALE OF TWO TRAYS





THERMALLOY TRAY—hot acid etch made after removal from service. Note that through proper chilling and foundry practice, most cracks are superficial.



COMPETITIVE TRAY—hot acid etch after failure shows severe shrinkage and cracking. This tray was in service *less than half* as long as the Thermalloy tray.

THERMALLOY* QUENCH TRAY
GIVES TWICE THE SERVICE LIFE

At a major automotive plant, two sets of quench trays were recently ordered for carburizing shafts at 1650 F. Both were of standard design. One set was cast by Electro-Alloys of Thermalloy heat-resistant alloy—the other was a competitive make.

The illustrations above clearly show the condition of the two test trays . . . after the Thermalloy trays had been in service *more than twice as long* as the competitive make. Use of chills at critical points and proper foundry technique in the Thermalloy trays accounted for their much longer service life . . . by eliminating the shrinkage evident in the competitive tray. This test, made by the customer, clearly proved the added quality and strength achieved through the use of chills.

Whatever *your* heat-treat problem, it pays to make use of Electro-Alloys casting know-how—plus the outstanding physical properties of Thermalloy high-heat-resistant alloys.

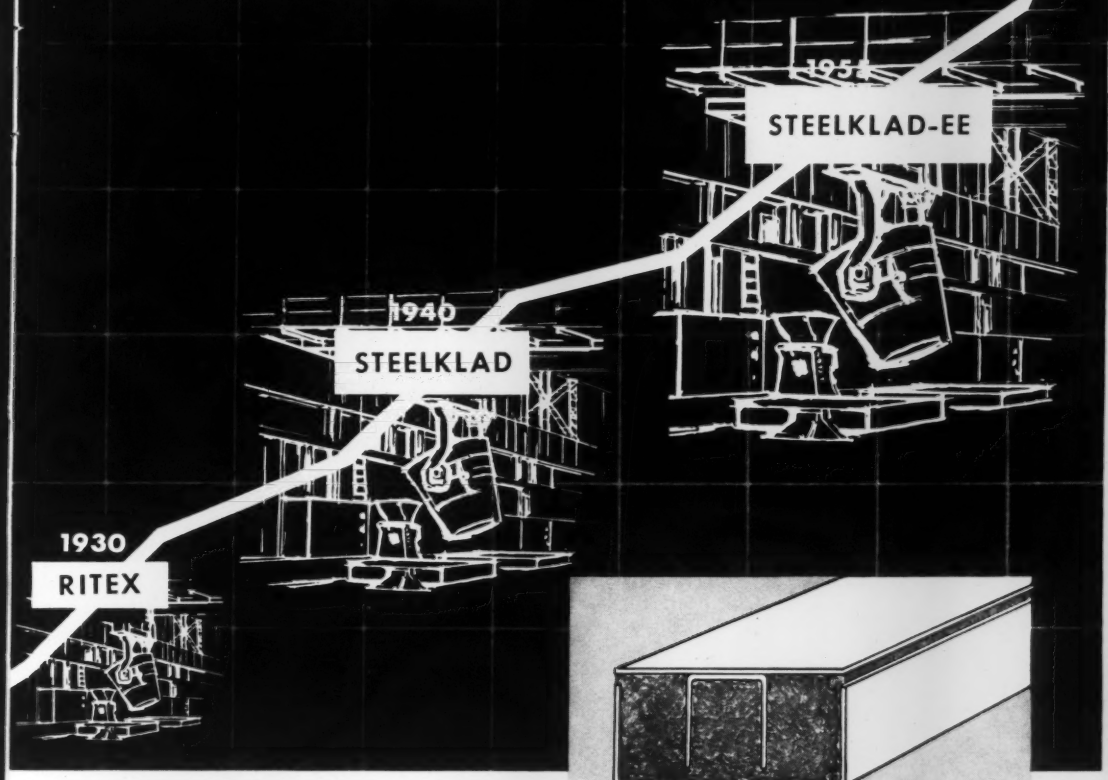
For further technical information on Thermalloy Heat-Treat Trays, write for Bulletin T-227 . . . Electro-Alloys Division, 9044 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.

AMERICAN Brake Shoe COMPANY **ELECTRO-ALLOYS DIVISION** Elyria, Ohio

STEELKLAD-EE

The ORIGINAL Internally Plated Brick



CROSS SECTION OF STEELKLAD-EE

Steel production in the U. S. A. has more than doubled in the last quarter century. General Refractories' constant improvement of basic brick for steel making has greatly helped this striking growth.

Early in the period of expansion Grefco pioneered the development of chemically bonded RITEX brick. In the forties Grefco's STEELKLAD provided increased spalling resistance and still better refractory quality. Continuing research and study brought about the introduction three years ago of Grefco's patented STEELKLAD-EE. These brick have now proved themselves in a great many applications. In this short time STEELKLAD-EE has won a substantial and growing portion of the basic brick market. In many applications they have demonstrated increased life of from 25% to 50% over other basic brick.

The cut-away view shows how the STEELKLAD-EE internal plates are molded into the brick, making three bricks of one. These smaller refractory units are tremendously more resistant to the spalling and peeling action which has been characteristic of most basic brick on exposure to cyclical heating and cooling.

For expert advice on the use of this outstanding, new, basic refractory, consult your local Grefco representative.

A Complete Refractories Service

GENERAL REFRACTORIES COMPANY · PHILADELPHIA 2, PA.

GENERAL REFRACTORIES

YESTERDAY it wasn't there. Today, he picks it up and wonders: *why did it grow like that?* The miracle of growth! Whether it's a "toadstool" that springs up overnight or a cancer cell that suddenly comes into being, we've a lot to learn about the whole beautiful process of orderly growth . . . and the dreadful, senseless growth that is cancer.

The cancer puzzle is tied up in growth —growth of body cells smaller than the periods on this page.

Scientists, working under grants from the American Cancer Society, are ceaselessly studying cells—normal and cancer cells. And they too are asking: *Why?*

Why do cells suddenly change from normal growth to uncontrolled, disorderly growth? This question can be answered only by the most probing, painstaking and costly research.

Your contributions to the American Cancer Society will support hundreds of scientific studies necessary to save lives today and tomorrow.

Remember: Cancer can strike anyone. But you can strike back *hard* with your dollars. Send your gift to CANCER in care of your local post office.

AMERICAN CANCER SOCIETY

STEEL

NOW it's

91

COAT

Resinall® Metalite® Belts

FOR WORK AND WEAR...

91-Coat IS BEYOND COMPARE

More and more case histories prove 91-COAT abrasive belts out-wear and outlast all others

"Your 91-coat belts showed an average of 30% longer life than competition."

"Increased production from 91- coat Resinall Metalite belts resulted in order for 6000 belts."

"Now we get 50 pieces per belt instead of 6 . . . and on stainless steel!"

"Tests showed two-thirds more production than with competitive products."

"With 91-coat abrasives, production increased from 34 to 40 units."

"Your new belts startled us with a 3 to 1 jump in production."

Find out for yourself

You can prove that new 91-coat Resinall Metalite abrasive belts can spur more production, more mileage per belt . . . at no increase in price. Test them yourself. Write to set up a demonstration of 91-coat abrasives on your toughest job . . . at your plant or at our nearest "Abrasive Tech" Methods Room.

BEHR-MANNING CO.
MAIN OFFICE AND PLANT, TROY, NEW YORK
A DIVISION OF NORTON COMPANY

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

In Canada: Behr-Manning (Canada) Ltd., Brantford.
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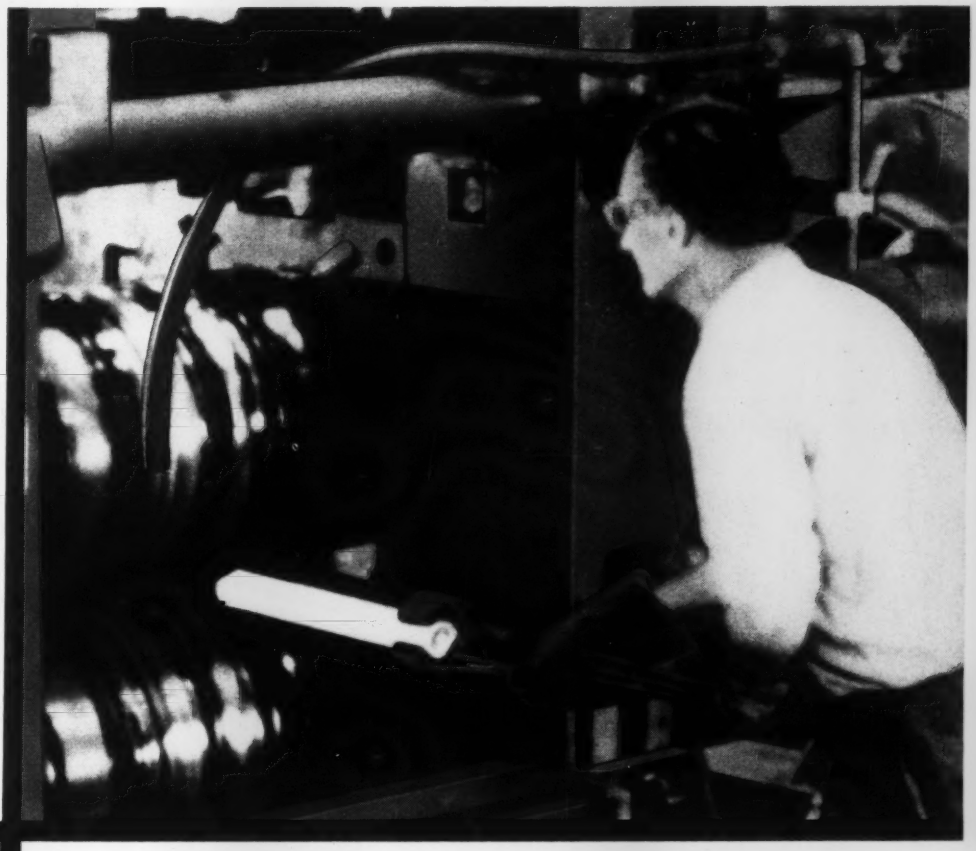


B

where something ***special*** *is required . . .*

BIRDSBORO *rolls and rolling mill machinery*

• Whether it's intricate experimental rolling, the taming of hard-to-work steels, or rough, tough, high production duty . . . Birdsboro's specialized mill machinery, or the complete family of rolls, has something specific to offer. You can measure the difference in your own plant: Increased mill production, less metal removal per roll dressing. A talk with your Birdsboro man can fill in other important details. *Main Office, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

MM 25-58

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS. Steel, Alloy Iron, Alloy Steel

Get BRASS that "fits your specs"

...as well as your "specs" fit you

Needs of Brass fabricators vary as widely . . . and as individually . . . as their own prescription eyeglasses. And Bristol is notably successful in fitting Brass to each customer's own peculiar needs with this same prescription exactness.

This could only be true of a compactly organized mill in which all customer-contact men have *both* mill and sales experience. It's not often that you find this situation. And it's not often that you find Brass made by the most modern methods to toughest old-fashioned standards of quality.

Next time you need strip, rod or wire . . . try Bristol Brass. You'll get the clearest picture yet, of what Brass can do for your product.

and for BRASS FORGINGS, too . . . get them from . . . ACCURATE BRASS CORP. (*Subsidiary of The Bristol Brass Corp.*) now in a new and modern plant at Bristol, Conn.

The **BRISTOL BRASS**
CORPORATION
Since 1850, makers of Brass strip, rod and wire in
BRISTOL, CONNECTICUT

Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse.

100% FINANCING

for your new plant

...and at low, low interest rates!

Communities in our service area are prepared to roll out the red carpet for desirable industry to the extent of *totally financing* construction of the plant.

It's a unique plan for lease purchasing that combines funds from non-profit community development corporations and the Pennsylvania Industrial Development Authority with first mortgages through private lending institutions.

West Penn Power is prepared to obtain information for you, in strict anonymity, about communities participating in this plan and, in addition, provide specific information on many other plant location factors to assist in your evaluation of WESTern PENNsylvania as a desirable location.

W E S T P E N N P O W E R

an operating unit of the WEST PENN ELECTRIC SYSTEM

Hello...

I'm Charlie Fife . . . of course every plant must have 100% financing of some kind; but, I'm sure you'll agree that this unique plan can solve a lot of problems, providing others, equally important, can be worked out as well.

Labor supply, for example. We have communities with excellent labor pools, both male and female, on which new industry can draw. But are the needed skills available at the right wage scale? Facts, figures and skill surveys from our files can tell you.

Because these problems are complex, West Penn Power maintains a staff of plant location specialists to assist in your evaluations. There is no charge for this professional service, of course . . . and you may be sure your confidence will be respected. Write today.

CHARLES M. FIFE, *Manager*
Area Development Department

WESTern PENNsylvania

WEST PENN POWER, Area Development Department, Cabin Hill, Greensburg, Pennsylvania S-2

Yes, I'm interested in WESTern PENNsylvania:

☐ Please contact me in strict confidence. ☐ Please send booklet, "Plant Location Services."

Name _____ Title _____

Company _____ Street _____

City _____ Zone _____ State _____

Packing Cost: 3 cents per ton

One steel strap packages this ten-ton steel coil. The strap is regularly applied in about thirty-six seconds. A Signode Model PN air power stretcher pulls the strap to 1600-pound tension every time; a Signode Model RCN 114 air power sealer applies the seal. There's no waste strap, and the cost of the strap and the seal together is only about 27 cents. The strength and low cost of the steel strapping itself, plus the speed and simplicity of application, rule out any other way of doing the job.

Find out how Signode strapping, tools, and skilled helpfulness with methods can make your product cost less to handle, store, ship and receive. There's no obligation...just call the Signode man near you, or write:

SIGNODE

First in steel strapping

SIGNODE STEEL STRAPPING CO.

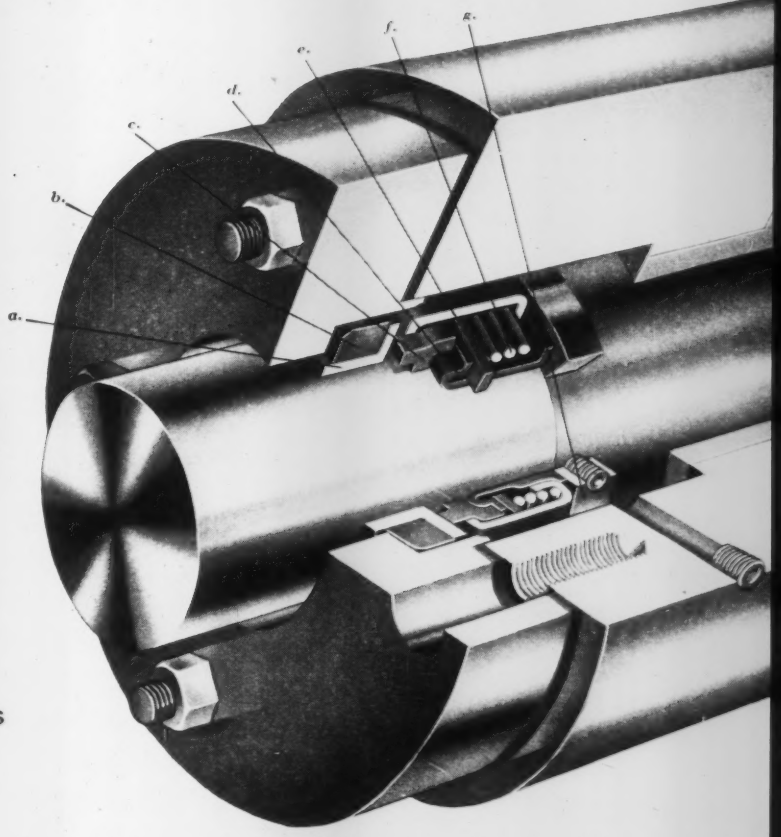
2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

MORE OF THE GARLOCK **2,000**

No More Stuffing Box Maintenance!

Install Garlock Package Seals on Your Present Pumps



- ELIMINATE LEAKAGE AND SHAFT WEAR
- REDUCE DOWNTIME
- CUT MAINTENANCE COSTS

When leakage and maintenance are serious problems in the operation of your pumps you'll find a perfect answer in Garlock MECHANIPAK* Seals. Installation on new or existing equipment is simple. And, several designs are available to meet a variety of operating conditions: pressures to 150 psi, temperatures to 212° F., and shaft speeds to 2000 feet per minute. Sizes for shafts from $\frac{3}{8}$″ to 3″ diameter for sealing against water, oils, alcohol, mild acids and solvents.

MECHANIPAK Seals are another important part of "the Garlock 2,000"... two thousand different styles of packings, gaskets and seals for every need. It's the only complete line ... that's why you get unbiased recommendations from your Garlock representative. Ask him for complete data on this long-life, maintenance-free MECHANIPAK Seal. Or write for Folder AD-150.

a. ***Stationary Seat*** *of ceramic, Ni Resist, or bronze has precision lapped sealing face for perfect contact with carbon ring.*

b. ***Vibration Ring*** *of Buna-N positions stationary seat in a flexible mounting and acts as static seal.*

c. ***Seal Ring*** *of carbon is also precisely lapped to match sealing face of stationary seat.*

d. ***Roll type Bellows*** *permits free movement of seal ring.*

e. ***Shell,*** *encases entire rotary unit and furnishes mechanical drive for seal ring.*

f. ***Stainless Steel Spring*** *with load precisely calculated to face area of seal.*

g. ***Stop Collar,*** *or shoulder, positions seal to specified operating length.*

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

*Registered Trade Mark

How Fred Lee

Stan Bozek, Abrasive and Methods Engineer at Marlin-Rockwell Corp., Plainville, Conn., discusses new form grinding technique for ball bearing races with Fred Lee, Manager of Bay State's district office in Bristol, Conn.

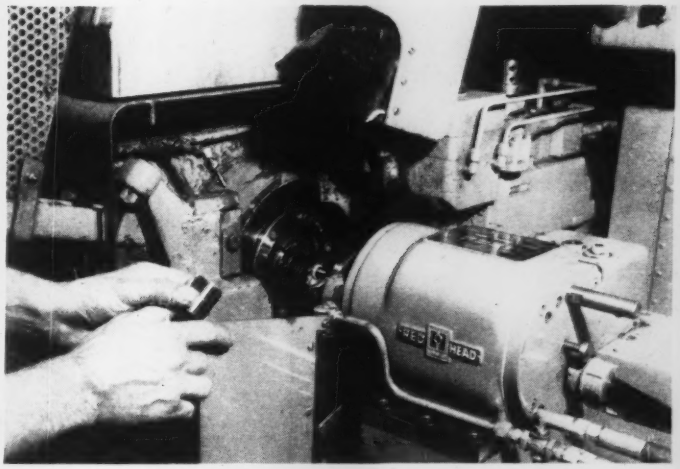
helped revolutionize the grinding of bearing races

Ball bearings used in missile guidance systems and other highly critical applications have to have super-accurate races . . . but cost is vitally important, too. That's why Marlin-Rockwell Corp., of Plainville, Conn., was one of the first bearing manufacturers to switch from the oscillating rubber wheel grinding technique to form grinding.

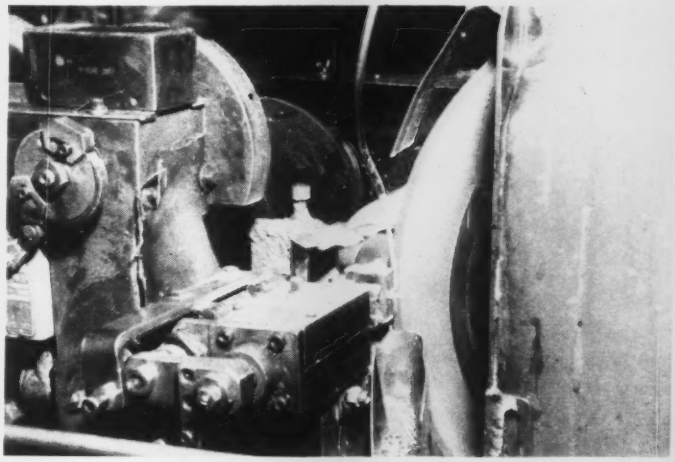
Bay State's Fred Lee, recognized as one of the country's leading authorities on bearing grinding, was called in to discuss the problem with Marlin-Rockwell engineers. After exhaustive study, he specified semi-friable, fine grit, medium grade vitrified wheels that varied in size from ½" to 20" diameter.

Result: 50% closer confinement of race curvature, 100% improvement in roundness and consistent uniformity in multiple production runs. General foreman John Gworek, veteran of 30 years of precision bearing grinding, says flatly: "It's the *only* way to grind them."

Like Fred Lee, your own Bay State representative may be best known as an expert in a particular type of grinding but his general knowledge of grinding techniques is both wide and deep. **Better grinding at lower cost . . . that is his business.**



Form grinding 2 ball races at the same time on water pump bearings with Bay State vitrified wheel, diamond dressed only every sixth piece, on Heald 1701 Form Grinder.

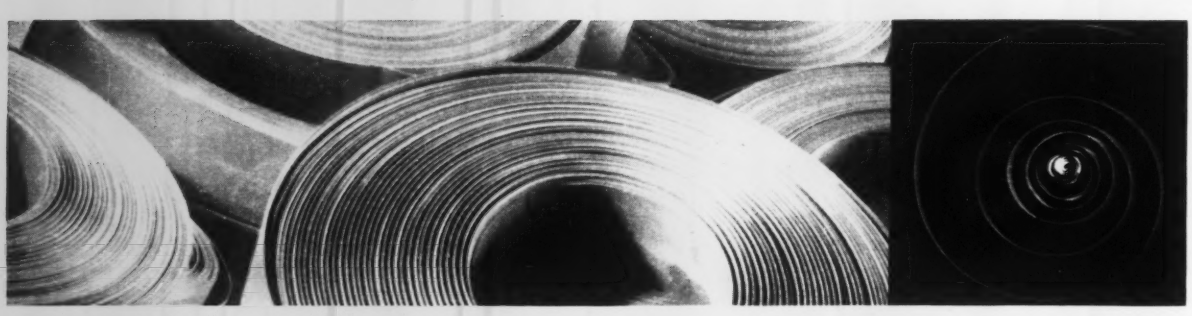


Rough form grinding O.D. contour of inner races with 20" diam. Bay State vitrified wheel (Crush formed) on Cincinnati Microcentric Grinder.

BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. *Distributors:* All principal cities.



How they're using

Wallace Barnes Cold-rolled Specialty Steels

1. *In Three Drawing Stations*

The part shown in illustration one was made from .59 – .74% carbon steel in three drawing stations. From .70 – .80% carbon, this piece should have four or five drawing stations. The piece could be made from .90 – 1.05% carbon, but would require seven drawing stations with fully annealed steel.

2. *Blanked on 45° Angle*

The stamping shown in the second illustration was made from .70 – .80% carbon spring steel. It was blanked and pierced on a 45° angle, with small holes pierced to prevent fracture in later forming and bending. It was then given severe secondary forming. The small tab shows "orange peel" and probable fracture would occur if the part were formed from .90 – 1.05% carbon.

3. *All Flanging One Operation*

Our third part is a gun stamping made from .70 – .80% carbon with a sharp bend with the grain in one stroke of the press. Higher carbon will fracture due to its less ductile qualities.

4. *Thirteen Steps Progressive*

The fastener shown in the fourth illustration was made from the .59 – .74% carbon steel, the only spring steel which would take the bends and draws to which it is subjected here. All the higher carbon steels were rejected because they failed under the cold-work necessary to produce the two small extrusions. It took seven reductions to bring these extrusions within tolerance. There were thirteen steps total in the progressive die.

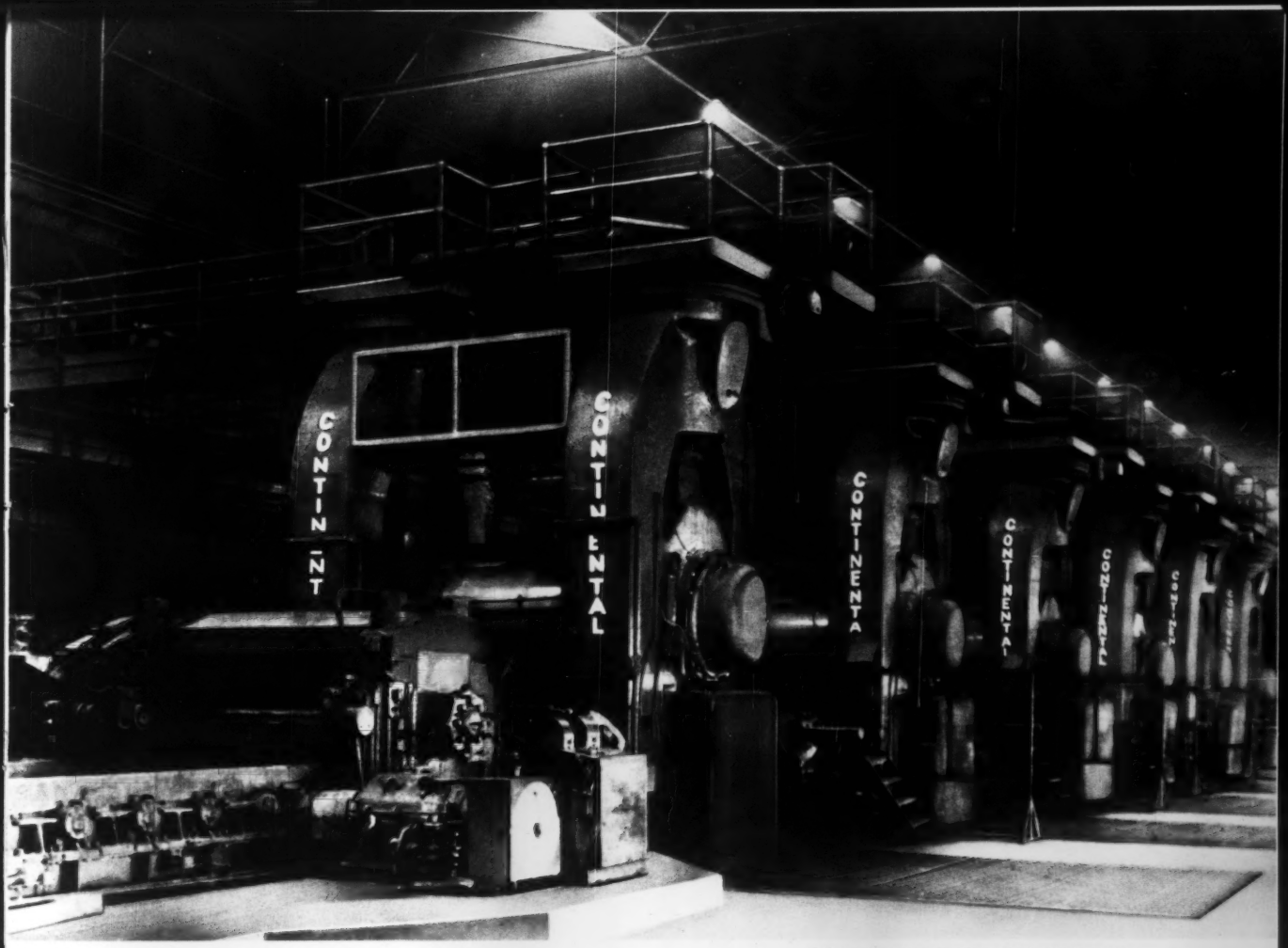
These examples show how proper steel selection may save operations and insure satisfactory performance. Among the many sizes and types of Wallace Barnes cold-rolled specialty steels is the right one for your application. Send for "Physical Property Charts" giving tensile strength and forming properties of Wallace Barnes tempered steels.

Wallace Barnes Steel Division

Bristol, Connecticut

Associated Spring Corporation

5808



80-inch continuous hot strip mill

BLAW-KNOX
CONTINUOUS HOT STRIP MILLS

Blaw-Knox designs and builds a full range of continuous, semi-continuous, and single stand reversing hot strip mills. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

MEN WHO BUY STEEL SAY THIS:

"Steel Service Centers give us better production efficiency"

W. W. Scull, Director Manufacturing Services, The B. F. Goodrich Company

"Needless to say, manufacturing costs in our business have to be carefully controlled. Steel Service Centers have proved invaluable to us in keeping costs down by helping us maintain better production efficiencies.

"Their availability to us for steel helps keep production on schedule. Costly shutdowns, layoffs, lost contracts are avoided. We know we can get exactly what we need, when we need it—at a reasonable service charge."

Include Steel Service Center steel *stocks, cutting and handling equipment, storage space* and general service *availability* in your steel buying plans. Perhaps you will find, as The B. F. Goodrich Company did, that your production efficiencies can be improved. American Steel Warehouse Association, Inc., 540 Terminal Tower, Cleveland 13, Ohio.

AMERICAN STEEL WAREHOUSE ASS'N

The American Steel Warehouse

...YOUR STEEL SERVICE CENTER

hoover locks lube in, dirt out for the lifetime of the bearing

Hoover is first to seal ball bearings with TEFLON! Hoover makes *sure* that lube stays in, dirt stays away from the smooth, mirror-like working surfaces of high quality *Micro-Velvet* Lapped Balls and *Hoover Honed* Raceways. You get greatly extended bearing life.

Why TEFLON for seals? TEFLON is the remarkable new product of chemistry . . . extra tough . . . extra long wearing . . . and so slippery that there is practically no torque resistance. Hoover seals are ingeniously engineered to maintain positive contact and improve lube circulation. Permanently attached full metal shields lock the seals within the bearing, safe from damage.

Use Hoover Ball Bearings with single or double seals of TEFLON for high speed applications, electric motors, or wherever periodic lubrication or maintenance is not practical, as in sealed units. They are available in both light and medium series.

*TEFLON is DuPont's Trademark for its Fluorocarbon Resins.
Micro-Velvet and *Hoover Honed* are Hoover Trademarks.

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BALL AND BEARING COMPANY
ANN ARBOR, MICHIGAN
SALES OFFICE AND WAREHOUSE: 2020 SOUTH FIGUEROA, LOS ANGELES 7, CALIFORNIA

OTHER HOOVER QUALITY BALL BEARINGS:
(light, medium, heavy series)

- Single and Double Shield
- Single Row Radial
- Combination Felt Seal and Shield
- Double Row
- Cartridge

NEW! BULLETIN 100—gives complete information on Hoover Bearings with Seals of TEFLON. To get your copy, just return the coupon below.

Hoover Ball and Bearing Company
Ann Arbor, Michigan

Please mail my copy of Bulletin No. 100 on Hoover Bearings with Seals of TEFLON.

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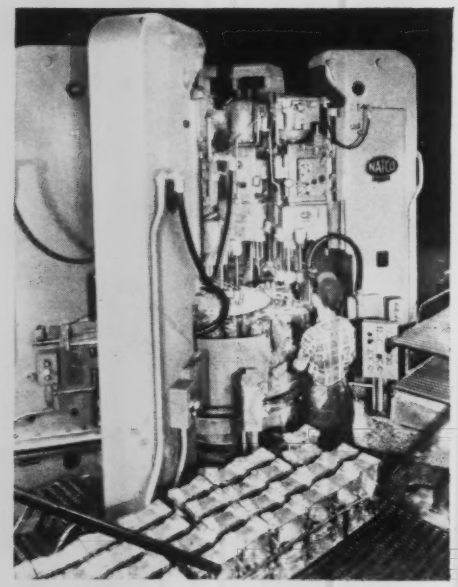
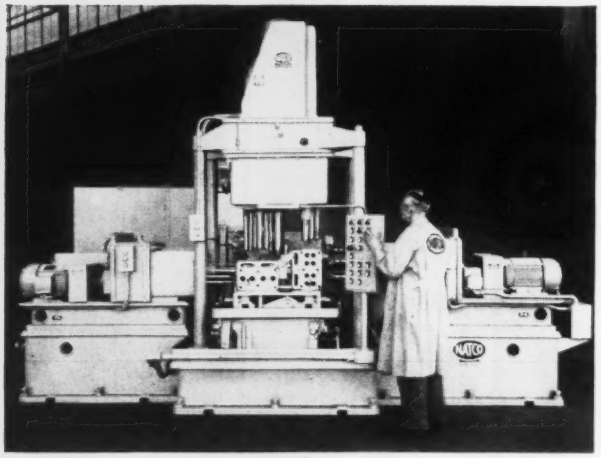


Index Machine produces 400 cylinder blocks per hour. *Operations on eleven holes include drilling, chamfering, reaming, counterboring and burnishing. Job No. BS-1.*



Four-way tapping machine uses 36 lead-screw spindles *to process 30 diesel cylinder heads per hour. Four-position fixture holds two parts. Job No. 3719.*

Somewhere in Natco's Experience is a Money-Saving Idea for You.

Only Natco builds *all six* types of production drilling equipment. As a result, we're not "married" to a particular approach. We can recommend the one that is best for you, give you the most production for your money. Tell us about your jobs. Somewhere in our experience is a money-saving idea for you! Send for our Production-Photo Folders on the jobs shown here.

Drilling, boring, facing, tapping.

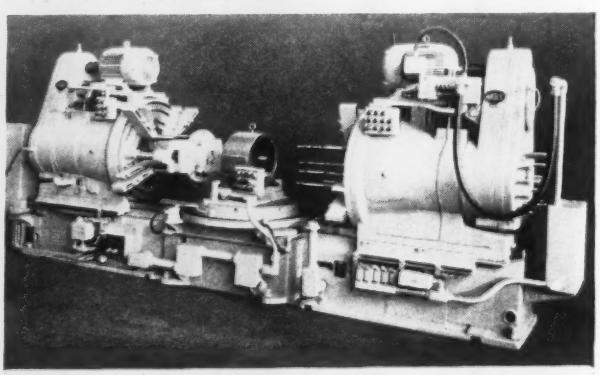
Only Natco Builds all Six

Standard multiple spindles, Way-type, Trunnion, Station, Index and Transfer Machines.

NATCO NATIONAL AUTOMATIC TOOL COMPANY, INC.
Richmond, Indiana

New Multiple Spindle machine drills and taps simultaneously. *Half the 16 or 24 spindles are driven electrically for drilling—the other half are driven by a hydraulic tapping motor. Suitable for production of 400 or more parts per hour or for general purpose use. Job No. 8672.*

Two-way Natco drills and taps a variety of motor frames and brackets. *Four-position index table holds either part. Left hand head drills only and is equipped for step drilling. Right hand head drills and taps. Both are adjustable for bolt circles up to 24½" diameter. Job No. 3724.*



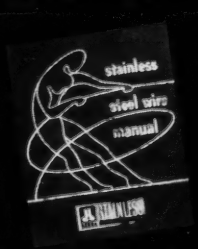
Announcing NEW SOURCE for stainless steel wire

J & L Stainless Steel Division's New Wire Mill Offers Wide Range of Wire Sizes

The increasing use of stainless steel wire in new product development, old product improvement and for experimental purposes has placed a new responsibility on the manufacturer of quality stainless steel.

To meet this growing need, J & L Stainless Steel Division is pleased to announce the opening of its new wire mill . . . to make available stainless wire in a wide range of sizes, finishes and coatings.

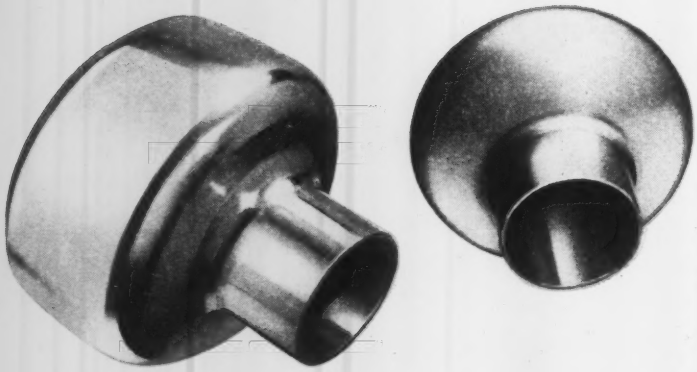
For data regarding wire, its properties and uses, consult our Stainless Steel Wire Manual. For special applications write in detail giving complete information about your requirements.



Wire now for your copy of J & L's new Stainless Steel Wire Manual.

Improve your Products with . . .
J&L STEEL STAINLESS
BAR • WIRE • SHEET • STRIP

Jones & Laughlin Steel Corporation • STAINLESS STEEL DIVISION • Box 4606, Detroit 34



4 OF THE MANY STYLES OF THE ONE-PIECE SEAMLESS DOOR KNOBS FABRICATED FROM RUGGED REVERE BRASS STRIP.

REVERE BRASS STRIP Stands the Gaff!

The one-piece door knobs shown are drawn from a single blank of Revere Brass Strip, presenting an attractively smooth, unbroken surface without the need for seams or welds.

Because they are made by a unique procedure the manufacturer tells us that the brass must stand up under mighty rugged going, and that to produce the quality knobs they do, at an economical production level, the brass they use must have:

1. *Uniformity of gauge.*
2. *Absence of any sign of fracture or crimping when drawn.*
3. *Consistently correct grain structure to insure a smooth, flaw-free surface on the finished knobs.*

The manufacturer also tells us that Revere Brass Strip has been filling that bill, with utmost satisfaction, for some time.

Revere Brass Strip may be able to help *you* make a better product at less cost. You'll never know until you talk it over with one of our TA's (Technical Advisor). There's no obligation, of course. And such a discussion could save you a substantial sum of money. Such has been the case many, many times.

COPPER ★ BRASS ★ 18 01 ★ REVERE ★ ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

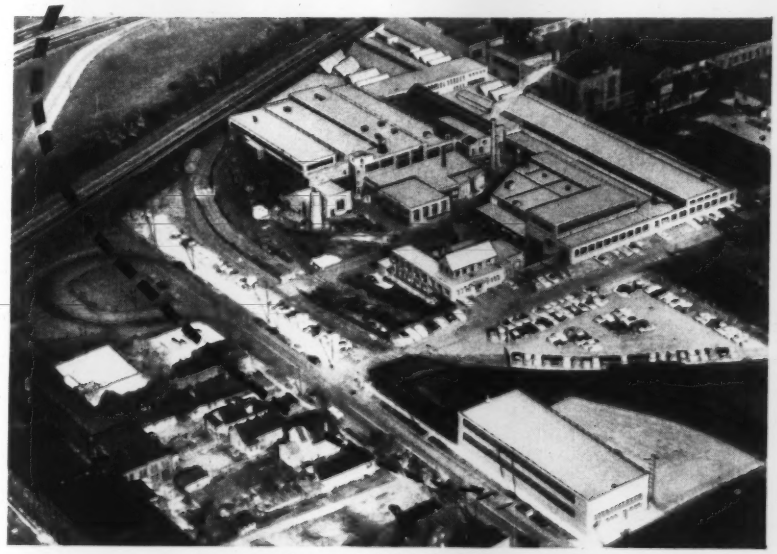
HILL ACME Research and Development Facility

FRINGE BENEFIT!

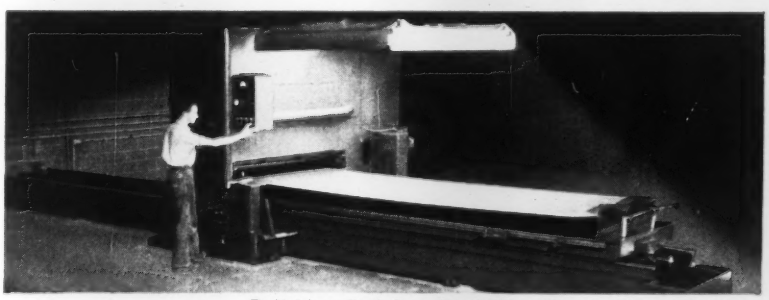
FOR OUR CUSTOMERS . . .

A brand new RESEARCH and TESTING facility where new methods and machines of HILL ACME manufacture are in operation on actual production work supplied by our customers and prospects for HILL Grinding and Polishing machines.

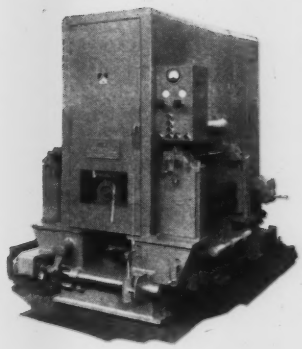
If YOU have a pre-finishing problem concerning ferrous or non-ferrous metals, plastic, lucite or similar materials we invite you to visit this innovation in the field of grinding and polishing.



The home of HILL Grinding and Polishing machines. Research facility is in foreground.



Polishing Stainless Steel Sheet for Sanitary Finish on a HILL sheet and plate polishing machine



HILL Pinch-Roll type machine for polishing strip on multiple units

THE HILL ACME COMPANY

1201 WEST 65th STREET
CLEVELAND 2, OHIO

Manufacturers of: "HILL" Grinding and Polishing Machines • Hydraulic Surface Grinders • "ACME" Forging • Threading • Tapping Machines • "CANTON" Alligator Shears • Bar-Billet Shears • "CLEVELAND" Knives & Shear Blades

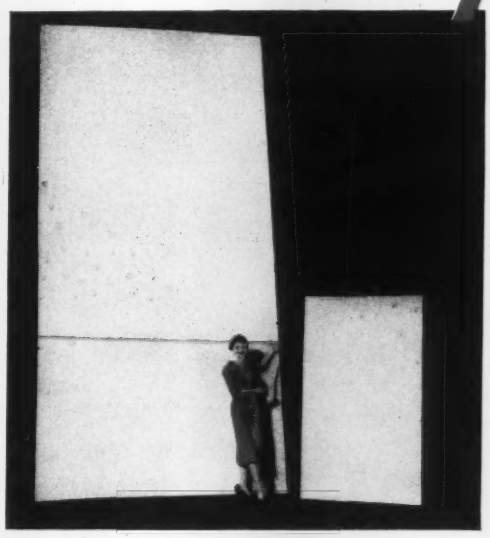
When you buy from U. S. Steel

STEEL+ PLUS IN ACTION: MARKETING ASSISTANCE

To help our customers who make and sell products of steel, United States Steel is launching a powerful new promotional program. Four-color spreads in *Saturday Evening Post* and *Time*, plus regular commercials on the *U.S. Steel Hour*, will show the public the many and vital ways in which "Today's USS Steels lighten your work, brighten your leisure, widen your world." In addition, a continuing trade promotion will merchandise this theme, and assist our customers in developing greater sales for their steel products.

American Bridge • American Steel & Wire and Cyclone Fence • Columbia-Geneva Steel • Consolidated Western Steel • National Tube • Oil Well Supply Tennessee Coal & Iron • United States Steel Homes • United States Steel Products • United States Steel Supply and Gerrard Steel Strapping United States Steel Export Company • Universal Atlas Cement Company

you get STEEL + PLUS

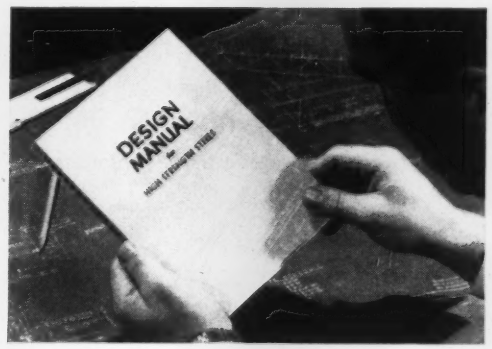


STEEL + PLUS IN ACTION: FACILITIES

It is very difficult to roll thin Stainless Steel sheets to extreme widths, but aircraft manufacturers needed them, so United States Steel found a way to do the job. Standard-size sheets of Stainless Steel are covered with heavy carbon steel plates, and the carbon plates are welded shut at the edges. The sandwich is then heated and rolled. Stainless Steel sheets as wide as *120* inches can be produced to exceedingly close tolerances with U.S. Steel's versatile facilities through this ingenious method.

STEEL + PLUS IN ACTION: RESEARCH

American railroads use hundreds of thousands of signal bonds—small copper jumpers that span joints between track sections and carry the electricity used in the vital train control signal systems. Researchers at the USS American Steel & Wire Division developed a bond with a built-in steel punch. Three whacks with a hammer and it's in to stay. No special driving tool is needed, and workers can install more per hour.

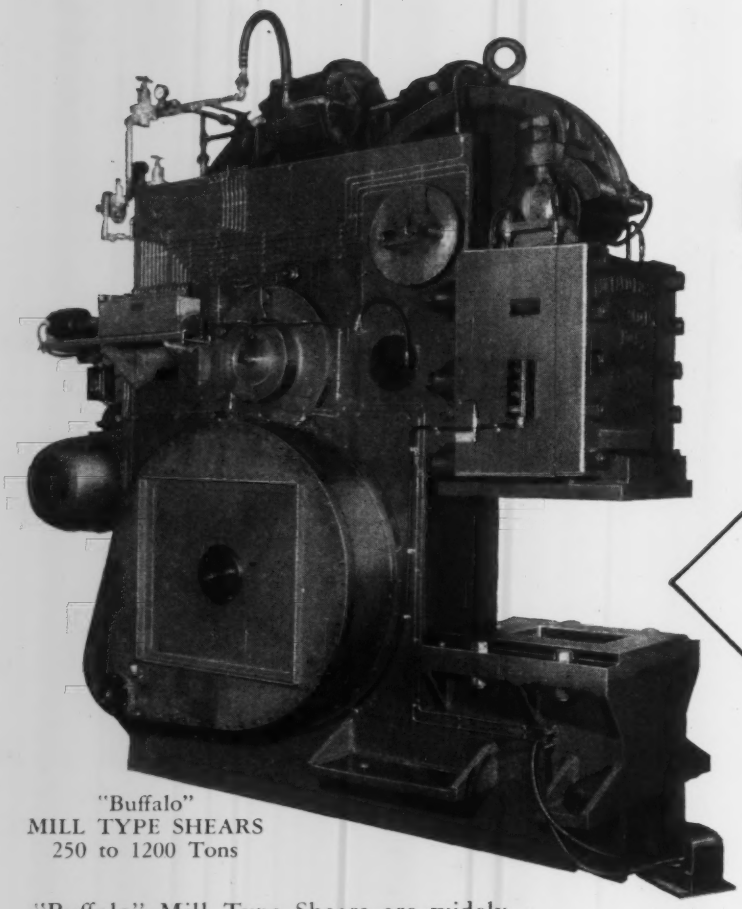


STEEL + PLUS IN ACTION: TECHNICAL ASSISTANCE

In the past three years, United States Steel has distributed over *80,000* copies of this 170-page "Design Manual for High Strength Steels." This is just one of scores of technical booklets that we prepare for our customers who want to know more about how to work with steel.

USS is a registered trademark

USS **United States Steel**



"Buffalo"
MILL TYPE SHEARS
250 to 1200 Tons

PLENTY OF POWER

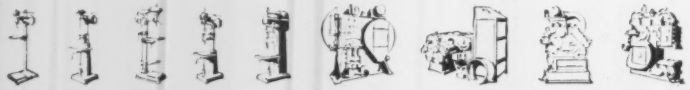
PLUS PLENTY OF TOOLING SPACE

FOR HEAVY DUTY PUNCHING, SHEARING, BLANKING

"Buffalo" Mill Type Shears are widely used throughout industry for performing heavy work falling between that produced by the standard C-type punch or shear and the four-column or straight side press.

Ideal for heavy-duty punching, shearing or blanking, these husky machines offer many unique features not found in standard shearing equipment. For example, the tooling space is not only very generous horizontally — its ample height permits the use of relatively heavy top and bottom bolsters on the plunger face and table.

"Buffalo" Mill Type Shears are available in 12 sizes — from 250 to 1200 tons, depending on the stroke length. For full information, contact your nearby "Buffalo" machine tool dealer, or write for Bulletin 3650.



BUFFALO FORGE COMPANY

158 Mortimer Street • Buffalo, N. Y.

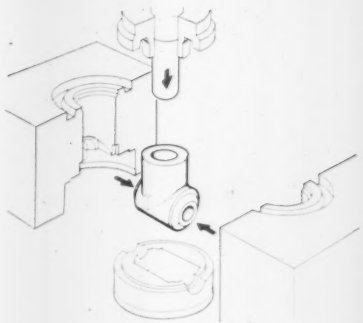
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

CAMERON SPLIT-DIE FORGINGS FOR NUCLEAR POWER PLANTS

The Cameron split-die process has made ferrous forging history in components for extreme service. These AISI Type 304 stainless steel check valve bodies for nuclear power plants are another chapter in the same story. The Cameron processes were perfectly suited to produce these unusual forgings. Even though test requirements exceeded all normal procedure, we were ready to meet the exacting specifications and complete another forging contract. Most important, performance in end use could be predicted and fear of failure eliminated.

Ferrous forgings to 8,000 lbs. produced by this method emerge from our presses in near final form. A vast array of shapes and sizes, heretofore impossible to forge in one piece, are now solving knotty problems in many demanding applications.



Every single production phase from melting the high quality steels for our ingot supply through blooming, forging and heat treating to final machining is performed in our shops under constant control. Men, instruments and machines are teamed to make results predictable. Grain structures in these remarkable forgings are excellent, welds are eliminated, and machining is made easier. The result is a better component which often costs less.

Extending the design scope of ferrous forgings has made Cameron important in solving many problems which confront advanced design today. Extreme service components for airframes, jet engines, guided missiles and a wide variety of other end uses are finding a solution in the Cameron split-die forging process. If you have a problem . . . call, write or come by

Cameron
IRON WORKS, Inc.

SPECIAL PRODUCTS DEPARTMENT
P. O. Box 1212, Houston, Texas

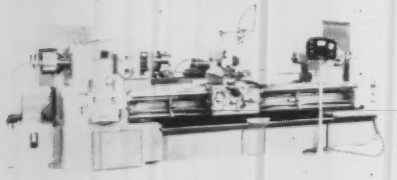
It's a breeze

TO CUT COSTS, BOOST PRODUCTION AND QUALITY WITH THE MONARCH "AIR-GAGE TRACER"

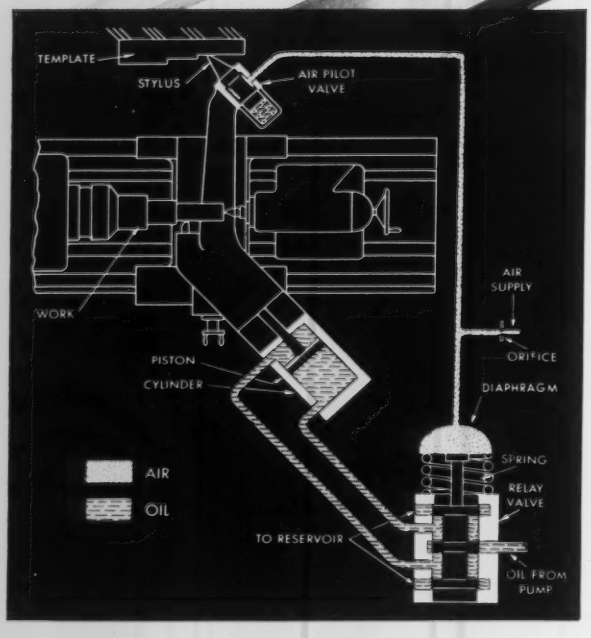
No lathe development in recent years has equaled template controlled turning for substantial cost reduction. Its advantages, when performed the Monarch "Air-Gage Tracer" way, are many. This duplicating method:

- Always outproduces a manually operated machine; in some instances as much as 8 to 10 times.
- Provides automatic sizing, thereby reducing spoiled work to the absolute minimum.
- Imparts a smooth, stepless finish on any combination of cuts, whether turning, facing or boring.
- Often halves amount of stock left for grinding; sometimes eliminates grinding and polishing operations.
- On most work, reproduces accuracy of template within ± .001".
- Eliminates the need for expensive form tools and the cost of multiple tool setups.
- Allows a complete setup change in as little as 15 to 20 minutes; tool change in 1 minute.

Write for complete descriptive booklet No. 2608. It contains dozens of typical job examples... ***The Monarch Machine Tool Company, Sidney, Ohio.***



Above is a Monarch Series 62 Preselector Dyna-Shift Lathe with "Air-Gage Tracer" and auto cycle unit. This duplicating means may be factory applied to all Monarch lathes.



This diagrammatic drawing shows simplicity of "Air-Gage Tracer" operation. Note that design deals with both air and oil in constant motion. Result—super-accuracy piece after piece, job after job.

Exclusive Features of the "Air-Gage Tracer"

1. The only lathe duplicator which utilizes the combination of air-hydraulic control. That's the secret of its super-accuracy.
2. The air circuit is an open loop servo system which provides air-gaging and multiplies both force and motion.
3. It's the simplest and most trouble-free of all lathe duplicating methods. Tracer head maintenance is never a costly problem.
4. Stylus pressure against template is only 5 to 6 ounces, practically eliminating template wear.
5. Either a flat or a round template may be used. Never is it necessary to use a large, bulky round template so that it can be indexed periodically due to excessive wear from high stylus pressure.
6. Available both in a rigid and swiveling type, the latter of which may be used at any setting between 45° and 90°. Universal nature of swiveling type a "must" for top production on many complex facing and boring operations.
7. The only lathe duplicator offered optionally with full automatic cycling and potentiometer feed control.

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER — TURN TO MONARCH

DOES specialized BUSINESS PUBLICATION ADVERTISING HELP SALESMEN?

No one is in a better position to give a hard-boiled, practical answer to this question than the men who spend their working lives on the sales front... the men the ads are supposed to help... the men who sell.

Here is the statement of a salesman who knows what advertising does for him when it appears in the industrial, trade or professional publications that serve the specialized markets to which he sells:

says Mr. Hegarty:

Jack Hegarty
Texas Instruments
Incorporated
sells to industry

"I sell semiconductors and other components to original equipment manufacturers in the electronics field. With the tremendous expansion in the electronic industry today, one of our problems is prompt coverage of the market when a new or improved device is announced. I can contact all my larger accounts within a few days, but it takes considerable time to cover the many smaller accounts.

"That's one of the reasons I think our advertising in business publications is so important. It covers all my prospects, large and small, and gets the story of our products to all three groups that can influence purchases—the engineers, the purchasing agents and top management. In some accounts 50 or 60 engineers will attend a meeting. However, there are still many decision-making personnel who can't attend because of other demands on their time. But I know that they will get our story from our advertising.

"On cold calls, many times my selling effort is greatly assisted by the 'pre-selling' of our advertising and it seems to me that advertising often gets me an entree at a higher level than I can usually get on cold calls.

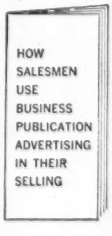
"It helps in other ways, too. For instance, we get inquiries for applications and devices that haven't been developed by our company. Prospects read the advertising, get clues, then contact us. In one case we ran an ad that basically showed a specification sheet on a new component. On one inquiry I followed up, the engineer had the magazine open on his desk right at our ad. He asked me, 'Can you meet this spec?' It was different—but, by some specialized design work, something we could do. I secured a first release order for over $70,000 just from this one inquiry.

"While my division of our corporation had first established its name in the industry on the basis of its work in semiconductors, we also manufacture many other components. They are in competition with units of companies longer established than we are. Here our advertising helps establish our name as a progressive company with a dependable reputation, good to deal with."

Ask your own salesmen what your company's business publication advertising does for them. If their answers are generally favorable, you can be sure that it is really helping them sell. If too many answers are negative, it could well pay you to review your advertising objectives — and to make sure the publications that carry your advertising are read by the men who must be sold.

How salesmen use their companies' advertising to get more business

Here's a useful package of ideas for the sales manager, advertising manager or agency man who would like to get more horsepower out of his advertising. Send for a free copy of the pocket size booklet which reports the successful methods employed by eleven salesmen who tell how they get more value out of their companies' business publication advertising.



You can be sure that more of your salesmen will use your advertising after they read how others get business through these simple methods.

The coupon is for your convenience in sending for your free copy.

NATIONAL BUSINESS PUBLICATIONS, INC.

NBP

...each of which serves a specialized market in a specific industry, trade or profession.

NATIONAL BUSINESS PUBLICATIONS, INC.
Department 12D
1413 K Street, N. W.
Washington 5, D. C. STerling 3-7533

Please send me a free copy of the NBP booklet "How Salesmen Use Business Publication Advertising in Their Selling."

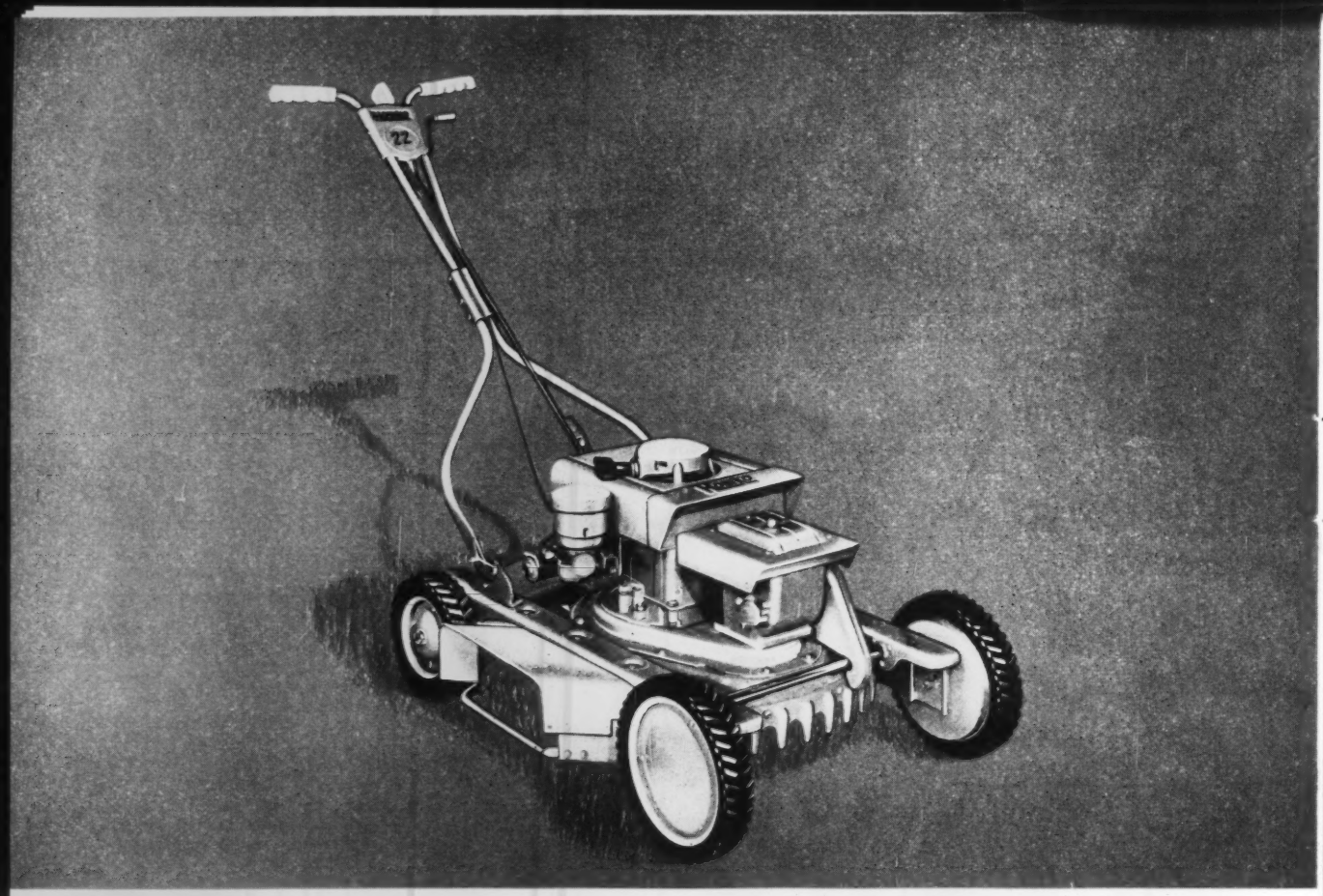
Name _____

Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____



Homko Thunderbird—Western Tool and Stamping Company's *all steel swept-line* power mower—mows without pushing. Engine drives blade and front wheel. Modern equipment like this demands modern protection. *All* Western power mower bearings are factory-lubricated with Texaco.

"Texaco helps keep our machining costs down, our output up"

says Plant Superintendent Lawrence Hancock, Western Tool and Stamping Co., Des Moines, Iowa.

"As the world's largest power mower producer, Western Tool and Stamping makes and sells 500,000 power mowers a year. There's no time for machine downtime. We get longer tool life, better finishes and fewer rejects with Texaco products," says Plant Superintendent Hancock.

Product	*Advantages*
Texaco Sultex Cutting Oil	assures longer tool life and better surface finish on hard-to-machine metals.
Texaco Soluble Oil	keeps grinding wheels and machining operations clean, remains stable in hard or soft water, allows dirt to settle out rapidly.
Texaco Regal Oil R&O	protects hydraulic circuits, prevents rust, sludge and foam.

Texaco Cutting, Grinding and Soluble Oils can improve your machining picture, too. Call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Visit Texaco at the Tool Show, Philadelphia, May 1-8 — Booth 2019

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

STEEL

April 14, 1958

Metalworking Outlook

Price Cuts, 1958 Style

Look for more scattered examples of price cutting this year to be handled like the zinc reduction last week. Unofficial price shading, in premium zinc grades primarily, had been going on for some time. American Smelting & Refining Co. finally made it official by cutting a half cent per pound from quotations on three premium grades used chiefly by diecasters (see Page 214). That was the first break in the premium price structure without a shift in primary levels since Oct. 20, 1955. Aluminum mill product prices are now being adjusted in line with the 2-cent drop in primary. And the price of copper has been cut a half cent a pound to 23½ cents by a custom smelter.

The Math of Inventory Cuts

Here's one reason it's difficult to peg customer inventories accurately: A company may have more days' stock of steel now than before the recession started but less tonnage because the metal goes farther at a slower operating pace. Example: William E. Ward, president of Russell, Burdsall & Ward Bolt & Nut Co., says his company's normal steel inventory is 75 days. The firm now has 130 days' stocks at the "present rate of operation." Yet, purchases of steel are at a reduced rate.

Does Defense Spending Stir Consumers?

Stepped up defense spending isn't likely to improve consumer confidence in the economy, says the University of Michigan's Survey Research Center. SRC has just analyzed consumer opinions. Other findings: Consumer attitudes point toward a mild but somewhat prolonged recession; tax cuts would have a more favorable impact on consumer attitudes and buying than defense spending; few people recognize their rising incomes are tied to a rising cost of living.

The Employment Patterns

While employment figures released last week caused President Eisenhower to say the recession is slowing down, signs in metalworking also point to an eventual upturn in the economy. Durable goods workers employed in March were 137,000 less than in February, compared with an employment decline of 243,000 from January to February. A similar pattern shows in primary metals, fabricated metals, machinery, and transportation equipment.

Hotpoint Stimulates Buyers

Hotpoint Co. has answered the President's plea for programs to build buyers' confidence. It tested an "O.K. Ike" buying plan in Chicago and Kansas City a week ago. It met with such success that the idea is being extended to every dealer in the nation. Incentive for the appliance buyers: No down payment, no payment until August. The campaign will last two

Technical Outlook—Page 135 Market Outlook—Page 189

weeks. Hotpoint experienced two other favorable developments: 1. Distributor sales to Chicago-area dealers in March were the highest in nine months—up $100,000 over March last year's. 2. March production of the company's appliances inched ahead of the February figure, the first month-to-month increase in many months.

Air Conditioning Warms Up

Watch for air conditioning sales to increase at least 10 per cent this year to 1.7 million-1.9 million units, say General Electric Co., Westinghouse Electric Corp., Carrier Corp., and Fedders-Quigan Corp. Two claim volume has already climbed, and all four say their high hopes are centered on the portable room units which are less expensive than complete home installations.

Ryan To Use Titanium

Ryan Aeronautical Co. will be using 9 tons of titanium a month to make jet pods and pylons for the new Douglas DC-8 Jetliner. Each set of pods (jet engine packages) and pylons (structures which support the engines from the wings) contains 1667 titanium parts, or nearly 7000 components for each four-engined Jetliner.

Diefenbaker and the U.S.

The basic goal of the Diefenbaker administration in Canada is to have the U. S. see the advantages which will come to both countries through the development of a North American approach to the use of natural resources and manufacturing facilities of both nations. At present, the Canadians argue, the U. S. is getting most of the advantages at Canada's expense.

American Operations in Cuba

American business activities in Cuba's troubled Oriente province are continuing. National Lead Co., which operates the Nicaro nickel facilities in northeastern Oriente, says nickel shipments have been normal. Freeport Sulphur Co. says its Moa Bay Mining Co. is continuing construction work on schedule at its nickel and cobalt facility. The Texas Co. is maintaining normal operations at its Oriente refinery.

Straws in the Wind

Design, engineering, and tooling expenditures for the next three years on Ford cars and trucks will exceed the $185 million spent in '57 and the $246 million spent in '56 . . . Pittsburgh Steel Co. operated at a loss in the first quarter and prospects for the second quarter aren't bright . . . Some $9.7 billion worth of new construction was put in place in the first quarter, slightly above 1957's first quarter in dollars but about the same in physical volume . . . Air pollution is costing about $65 a year for every man, woman, and child living in urban areas . . . Westinghouse chairman, Gwilym A. Price, forecasts lower first quarter earnings than a year ago, but expresses "cautious optimism" for business in 1958 . . . Kaiser-Nelson Steel & Salvage Corp., Cleveland, will dismantle and salvage the Donora Zinc Plant of U. S. Steel Corp.'s American Steel & Wire Div.

"Surface Finish On These Clips Has To Be SUPERIOR!"

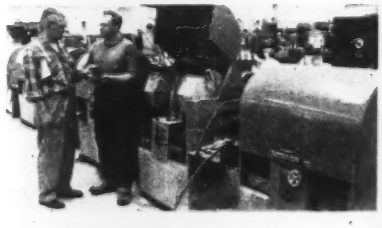
Robert Daly, Finishing Supervisor, holds sparkling Arrow pen clips finished in one of the nine ALMCO barrel finishing machines used by The Parker Pen Company.

BECAUSE THE ARROW is a trademark of The Parker Pen Company, the surface finish on each of these distinctive pen clips has to be more than just good. *It has to be superior!* What's more, production must be high and costs must be low.

That's why The Parker Pen Company now has *nine* ALMCO precision barrel finishing machines running *around the clock* in their parts deburring and finishing department. Used for cutdown operations, descaling after heat treatment, deburring and polishing, the scientific ALMCO Supersheen method helps the Parker people to meet high standards of quality, reduce costs and increase production, simultaneously!

Perhaps ALMCO finishing methods can do as well for you. It's no trick at all to find out. Just write us on your letterhead asking for an ALMCO sales engineer to call. Or, send sample parts and specifications on results desired direct to ALMCO's main laboratory at Albert Lea, Minnesota.

Meanwhile, send today for your FREE 52-page SUPERSHEEN barrel finishing handbook. Profusely illustrated.



Even though the nine ALMCO machines are in use 24 hours a day at Parker Pen, operators report that little maintenance is required to keep them in top-notch working order. That saves money, too!

ALMCO

QUEEN PRODUCTS, INC.
154 Marshall Street • Albert Lea, Minnesota
Subsidiary of KING-SEELEY Corporation
Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven and Philadelphia
IN ENGLAND: *Almco Division of Great Britain, Ltd., Bury Mead Works, Hitchins, Herts, England*

You can make lighter-weight parts with 3 new grades of Armco High-Strength Steel

Sturdy, impact-resistant auto bumpers are made from Armco High Strength No. 3 because they often require considerable forming. They can be plated, too, for top appearance.

Because long service life is so vital in railway cars, Armco High Strength Steels No. 1 and No. 2 are specified for many key parts.

Now you can choose from three low-cost grades of Armco High Strength, Low-Alloy Steel—all offering the design advantage of strength with light weight, but each developed to do specific jobs.

Armco High Strength No. 1 offers a minimum ultimate tensile strength of 70,000 psi; a minimum yield strength of 50,000 psi. It has from four to six times the atmospheric corrosion resistance of mild steels, plus superior paint-holding qualities. For applications where fabrication is limited to flanging and light forming, it supplies superior strength and service life.

Armco High Strength No. 2 is more workable than No. 1, but provides equivalent atmospheric corrosion resistance, and only slightly lower mechanical properties.

Armco High Strength No. 3 meets the need for a strong, low-alloy steel that can be readily drawn or formed and has a surface suitable for plating after proper preparation. Although stronger, its corrosion resistance equals that of mild steels.

Why not investigate these new grades of Armco High Strength Steel? One may offer you the opportunity to give your product the sales benefit of light weight without sacrifice of strength. Just fill in and mail the coupon or contact your nearest Armco Sales Office.

Other Armco Steels for top-quality products include Stainless Steels, ALUMINIZED STEEL, ZINCGRIP®, ZINCGRIP PAINTGRIP®, Cold-Rolled PAINTGRIP, Enameling Iron, Electrical Steels, Welded Steel Tubing, Long Ternes, and high-quality Hot- and Cold-Rolled sheets.

ARMCO STEEL CORPORATION 1938 Curtis Street, Middletown, Ohio

Send me more information about these Armco High Strength Steels: ☐ No. 1 ☐ No. 2 ☐ No. 3

We make_____

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

ARMCO STEEL

ARMCO STEEL CORPORATION • 1938 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

A New Look at Autos

The eager crowds that were attracted to the International Automobile Show in New York last week should be another shocking reminder to American automakers that they need to do something about their cars.

The foreign cars shown ranged from scooters, motorcycles, and minicars to the big luxury jobs and a handful of special American creations, but low priced cars for family use stole the show.

Only a few years ago, interest in foreign cars was almost nil. But the economy and people have changed. Back in 1946, a car-hungry public stood in line to grab anything car builders could push off the assembly line. The warmed-over prewar models had pontoon fenders, conventional gear shifts, and a modicum of gadgets.

People were still standing in line for cars in 1947 and 1948 and could bank on getting one if they slipped the dealer a couple of crisp century notes or traded in their old jalopy for less than it was worth.

Production kept right on rising during the 1949 "recession" to satisfy what remained of the war-born urge for cars. Significantly, that year also marked the shift from a sellers' market to one in which the buyer could pick and choose what he wanted.

To entice more buyers, the auto industry began adding innovations like automatic transmissions, air conditioning, and power assists for brakes, seats, steering, and radio antennas. It doubled and tripled engine horsepower. It offered options galore (such as eight types of radios). It made ridiculous styling changes costing millions of dollars. It brought out models overlapping existing models until today, with one exception, there is no such thing as a low-priced car.

All those frills have been peddled under the guise of "catering to what the public wants," but, actually, they amount to planned obsolescence.

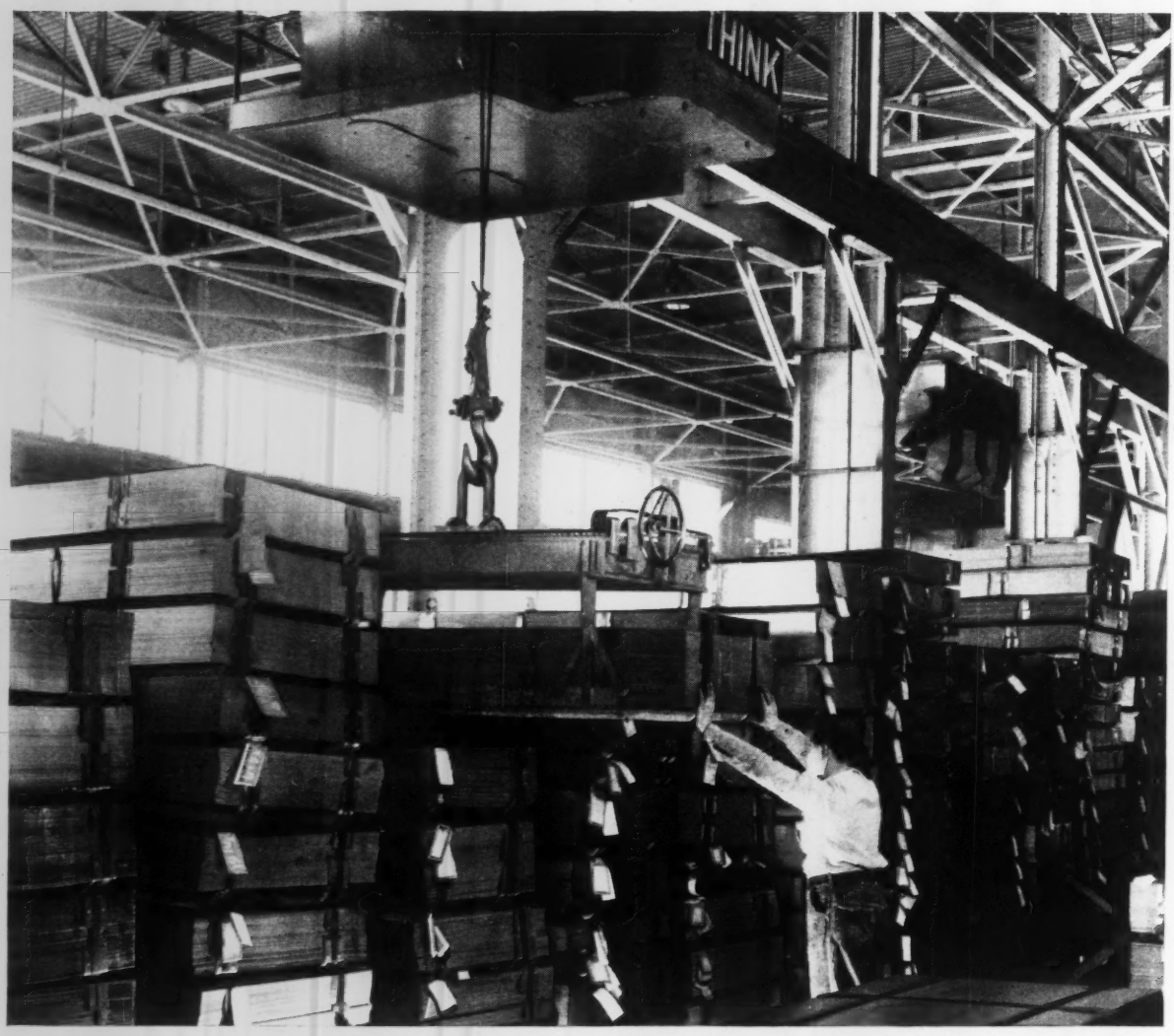
What the auto industry forgets is that family pride of possession no longer is confined to a shiny, new automobile. Other conveniences have moved in to take their share of family income.

Americans bought over 200,000 low-cost foreign cars in 1957 because they make economic sense, not because of their novelty.

Sales of imports this year are heading toward new highs while the domestic industry is flat on its back.

We hope the New York show convinces the auto industry that what the public wants is not necessarily a midget. It will buy a standard-size, dependable car if the price is right.

Irwin H. Such
EDITOR-IN-CHIEF



Sheet and strip—more than 20 kinds—and Ryerson delivers fast!

You name it—Ryerson has it.

Hot and cold rolled sheets. Pickled and oiled sheets. Tight-coated galvanized and galvannealed sheets that won't flake or peel when you form them. Stainless sheets. Ryex expanded metal. Perforated sheets. And many others, all in a wide range of gauges and pattern sizes.

Need special sizes? Modern equipment cuts them to your specifications quickly and economically, in blanks, straight lengths or coils.

Ryerson also offers a complete line of metalworking machinery and tools to meet virtually every requirement.

When you want sheet and strip, give Ryerson a call—it pays!

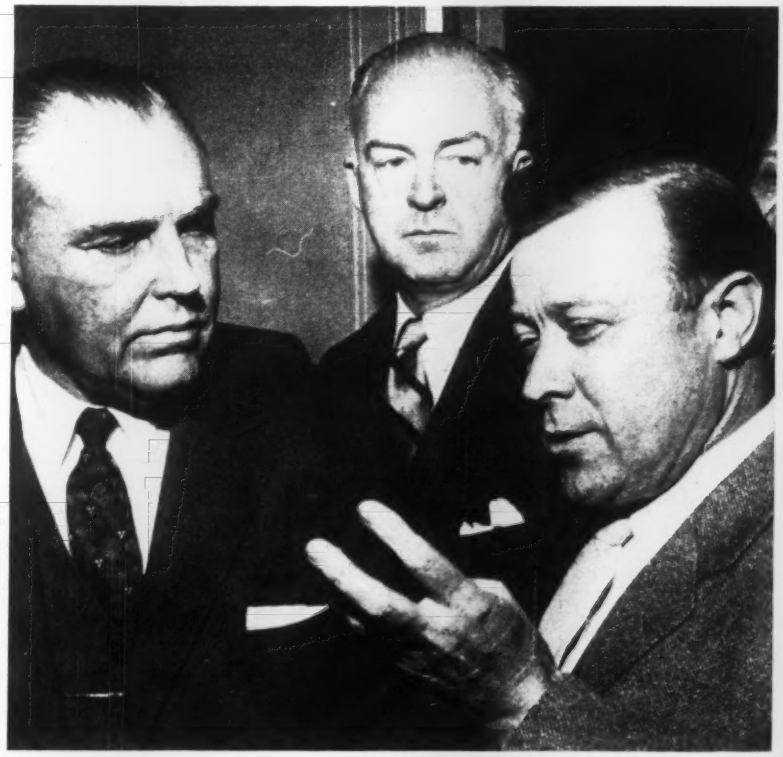
RYERSON CERTIFIED QUALITY

RYERSON STEEL

Member of the INLAND Steel Family

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, tubing, industrial plastics, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



NEA

L. L. COLBERT *Chrysler* JOHN LEARY *Chrysler* WALTER P. REUTHER *UAW*

As auto labor contract talks proceed . . .

Key Issues Take Shape

ASSERTIONS that the UAW will drop its profit sharing scheme aren't as loud as they were a few weeks ago. But insiders still feel Walter Reuther won't be able to push his plan through. At this point, productivity and contract length shape up as the key issues.

Productivity—Persons close to the action say the union is purposefully vague in wording its productivity demands so it will be able to wiggle off the hook gracefully if it accepts automakers' yardsticks.

Speculation is that the companies' method of measurement (which fixes the annual improvement factor at 2.6 per cent) will be adopted. But they may have to make other concessions. One possible yielding point: Another cent per hour for SUB improvement.

Contract Life — The UAW will push hard for a short contract so that it can come back for more money when the recession ends. It may ask for a reopener in the summer of 1959. But it likely will settle for a two-year pact (vs. the current three-year job).

United Front?—Bargaining separately but concurrently with all car builders allows the union to probe for weak spots and pressure points so it can play one company against another. But talk is that the Big Three are quietly cooking up joint strategy to counteract the UAW battle plan.

How the tables are set now:

GENERAL MOTORS is reportedly offering to extend its present contract with the UAW for another two years. That would guarantee Walter Reuther's boys a minimum wage boost of 12 cents an hour between now and 1960.

The counteroffer is aimed primarily at the automatic increase clauses of the contract; it will leave room for further discussion of seniority and other fringe benefits. Union's first reaction: Negative.

AMERICAN MOTORS CORP. is aping labor tactics by making demands on the UAW. Motordom's minority member has asked for a two-year freeze on wages and economic fringes to give the Big Three a chance to "catch up with AMC's higher wages, more costly benefits, and plant practices."

The company cites figures showing the present average wage package totals $3.07 per man per hour, against $2.90 for GM workers. Other AMC demands: 1. Trim the amount of paid time for snacks and washups (now 44 minutes, compared with GM's 24 minutes). 2. Tighten up on holiday pay eligibility and pension rules. 3. Revise seniority to reduce costly bumping.

Edward L. Cushman, AMC's industrial relations vice president, also wants pay, fringe, and working benefits of the appliance division patterned along the lines of the appliance—not the auto—industry.

CHRYSLER negotiators came back from a week's recess last Friday to find the International Society of Skilled Trades had filed petitions for representation elections involving 395 tool and die workers at two Detroit area Chrysler plants.

That's the second move by skilled trade outfits to woo Chrysler workers; the Operating Engineers filed an earlier petition. More are expected. The society's actions will have no immediate effect on UAW-Chrysler talks which have been routine so far. Fireworks are expected shortly as negotiators send up the transfer rights flare.

FORD MOTOR CO. talks begin again tomorrow. Ford bargaining seems to be following about the same trail blazed at GM, but it may move into preliminary rounds of the profit sharing fight earlier.

TO THE USER OF CAPITAL EQUIPMENT

Leasing offers these opportunities:

1. It can fill the gap for temporary production runs.
2. If you have a cost-plus contract for a specific period, lease payments can be applied as a cost factor.
3. There may be a tax deferment advantage if: Lease payments are fully deductible, and lease deductions from current income are greater than the depreciation allowed under outright purchase.
4. Working capital can be freed for other uses.
5. It can help keep facilities up to date and reduce obsolescence costs.

Machinery Rentals: New Lease on Life?

CONVERSATION about leasing is on the increase. Whether you are a buyer or producer of equipment, it'll pay you to check its possibilities. Today's business climate provides the reasons:

For the builder, leasing is a good sales tool.

For the user who must cut costs through new machines and facilities to stay competitive, it offers several opportunities.

Six Reasons—There's no pat answer to when it's best to lease or buy on the installment plan. It depends upon your circumstances, but most equipment builders admit that the incentive to lease for tax reasons has been reduced. Here are the major reasons why you might want to lease:

1. To get equipment for temporary use. The seasonal canning industry does a certain amount of short term leasing. This practice is limited because many equipment producers generally do not make new equipment available under such an arrangement. But some dealers and leasing companies offer used and rebuilt equipment, such as fork lift trucks, for temporary use.

2. To get equipment to cover a cost-plus government contract. This is related to No. 1, but longer periods are generally involved. If you have a government contract which runs for three years and you need a piece of equipment to supplement your facilities, leasing may prove more advantageous than a conventional purchase. Lease payments can be fully charged off as expense.

3. To get equipment when you're tied up with a loan agreement which prohibits you from going deeper into debt. In some instances, an indenture does not prohibit leasing.

4. For tax advantages. Since the elimination of the excess profits tax and revision of the depreciation laws, leasing offers limited advantages. Tax deferment value depends upon: (a) The lease payments must be fully deductible. (b) Lease deductions from current income must be greater than depreciation allowances if the equipment were purchased.

5. To preserve or stretch out capital. In this instance, leasing serves the same purpose as an installment purchase. But these factors should be checked: Compare the down payment of the installment plan with leasing payments. If you plan to exercise a lease option-to-buy, how do total costs (interest and principal) compare? Taxes should be equal.

Another factor: Sales managers and financial executives privately admit that credit investigations and requirements for leases are just as strict as those for installment sales. Occasionally, a buyer who is turned down on an installment purchase gets the green light on a lease.

6. To reduce obsolescence and maintenance costs and keep equipment and facilities up to date. Opportunities vary with the rate of obsolescence of the equipment and whether your lease includes maintenance.

Case Studies—To the equipment producer, leasing can be a good sales tool. Many builders have stayed away from it because "deferred payment programs are filling our needs." Others like DoAll Co., Kearney & Trecker Corp., Clark Equipment Co., Yale & Towne Mfg. Co. are pushing leasing to boost sales.

Clark Equipment recently purchased Lift Truck Rental Corp., New York, and formed Clark Rental Corp. to lease and rent material

But watch out for tax pitfalls

It's not a lease if:

1. A portion of the rentals is made applicable to an equity to be acquired by the user.
2. A lessee automatically takes title to the equipment upon payment of all rentals.
3. An option to buy is provided, and payment is nominal, such as the $1 purchase option.
4. Lease renewal terms are too low, such as $1 per year indefinitely.

handling equipment. Clark has about $20 million worth of industrial and construction equipment out on lease. Leases on industrial trucks can be arranged for periods of a few weeks up to five years. Clark assumes responsibility for maintenance, servicing, and the replacement of parts.

L. R. Rothenberger, vice president of DoAll, reports that over 90 per cent of its customers who take out leases with option-to-buy clauses exercise the options. Its basic lease is three years; monthly rates are arrived at by dividing the equipment cost by 36. DoAll's option-to-buy during the three-year lease period provides that 75 per cent of lease payments made will be applied to the purchase of the equipment if the option is exercised.

Kearney & Trecker started its formal leasing program in 1954. Since then, it has had about $5 million in machine tools out under lease. Three basic programs are offered. All have seven-year lease periods but different option-to-buy clauses: An option for terminating or purchasing can be exercised at the end of three years (Plan A); at the end of two years (Plan B); at the end of one year (Plan C).

Tax Angles—Most tax conflicts with the Internal Revenue Service center on option-to-buy provisions. Verson Allsteel Press Co. gives its customers a choice of three: 1. Option-to-buy at the end of the lease period for a dollar—lease payments during the life of the lease cover original equipment cost plus interest. 2. Option-to-buy at the market price. (One way to establish this is to seek bids for the equipment from used equipment dealers and add a dollar.) 3. Option-to-renew the lease at a reduced rate.

Odds are 10 to 1 the government will consider the first type a conditional sale. In the second and third, investigate your circumstances to determine if there is a tax advantage for you. Some lessors won't even offer purchase options, or will do so only if the lessee insists upon it.

In addition to being a good sales tool, leasing is often helpful in stabilizing the income of equipment makers during cyclical sales trends. Lease payments are coming in today on equipment built two, three, and four years ago.

Middleman—Forms which can't afford to carry their own leasing paper are turning to financial firms like Walter E. Heller & Co., Chicago. Its primary function is to provide financing and render collection, credit, and related services to the lessor.

A third party, the leasing company, can also enter the picture. Leasing firms generally take title to the equipment, providing the equipment producer an opportunity to convert a lease into a cash sale on his books. Financial firms are often responsible for bringing the leasing companies into the picture.

Something Different -- Leasing firms with a slightly different twist are making their appearance. Nationwide Leasing Co., Chicago, is one. It prepares a leasing program tailored to your needs, including sales kits and pep talks for branches and distributors. Your salesmen sell the customer on a leasing program. Nationwide, if it approves the lease, arranges for the financing; pays you the purchase price; and takes title to the equipment.

You can expect more types of leasing programs and more products to be available under lease. Howell Co., St. Charles, Ill., reports some of its distributors are offering to lease office furniture. Kriloffice, a Chicago office supplier, has added furniture leasing. Prenco Mfg. Co., Hazel Park, Mich., has set up a leasing program for its impregnation casting equipment. York Corp. leases air conditioning equipment.

Leasing experts offer this advice: Don't look to leasing as a tax dodge. Its advantages will depend upon your circumstances.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Capital Outlay Rises

Industry had an average capital investment of $16,000 per production worker in 1957, a $1200 increase in one year, reports the National Industrial Conference Board, New York. The gain results from a 7 per cent rise in investment and a 2 per cent decline in number of workers.

It was the third greatest one-year advance since 1939, NICB adds. The record: $1800 between 1955 and 1956.

Nonelectrical machinery has the most consistent rise in investment per worker. It has had an increase each year since 1948. Largest overall gains recorded since that year are in motor vehicles, instruments, and primary metals. All three groups gained slightly more than 70 per cent.

62 Ways To Use Photography . . .

ADMINISTRATION

File debulking
Form printing
Interior decoration
Office layout
Purchase schedule

TRAINING

Accident reports
Safety instruction

ENGINEERING

Drawing protection
Specification sheets
Stress reaction
Pilot radiography

MANAGEMENT

Control & organization charts
Stockholder reports
Progress photos
Record preservation
Picking plant sites

PERSONNEL

Job description
Identification photos
Payroll records
Orientation
Personnel records
Health records

PRODUCTION

Time study
Work methods
Schedules
Drawings
Process records
Patterns for parts

PRODUCT DESIGN & DEVELOPMENT

Styling
Stress analysis
Motion studies
Performance studies
Consumer testing

PURCHASING

Schedules
Duplicate engineering prints
Specifications
Component selection
Source information

RESEARCH

Flow Studies
Photomicrography
X-ray diffraction
High speed motion studies
Oscillography

MAINTENANCE

Plant layout
Repair proposals
Piping & wiring installations

SALES

Field estimates
Equipment demonstration
Price & delivery data
Dealer helps
Portfolios

TESTING & QUALITY CONTROL

Standards library
Instrument recording
Test setups
Radiography

TRAFFIC

Damaged shipments
Packing guides
Loading procedure

WAREHOUSING

Inventory control
Damage records
Waybill duplicates
Packing & loading records

Photography Does Many Jobs

A STEEL COMPANY is using photography to determine the mix of an alloy. The photo of a sample is compared with a master photo of the correct mix. Time needed to do the job was cut from 45 to 5 minutes.

The Air Force is using photography to record structural failings, yaw, pitch, roll, and fuel or engine malfunction during test flights of the Thor. It needed a tracking system that could be operated from the ground. Perkin-Elmer Corp., Norwalk, Conn., supplied it. The firm developed Roti, a high speed telescopic motion picture camera with a focal length of 500 in.

Applications like those helped photo equipment manufacturers ring up a sales record last year (see Page 89). Metalworking is leading the way in finding new industrial uses. Here are some you may be able to adopt:

Save Time—Burroughs Corp., Detroit, uses a Kodak high speed (3000 frames a second) camera to take movies of parts that do not perform to specification. The pictures are projected at 16 frames a second so engineers can watch fast moving parts in slow motion. Design defects spotted in the morning can be tackled in the afternoon.

Automatic Electric Co., Northlake, Ill., makes full scale reproductions of engineering drawings. Eliminating hand tracing saves time and money.

Save Money—Babcock & Wilcox Co., New York, makes quantity copies of engineering drawings by lithography. Estimated savings: $74,000.

Buffalo Forge Co., Buffalo, makes Verifax copies of invoices and other shipping papers which are circulated to receiving, purchasing, and other departments. Low cost and the elimination of errors are advantages over using a typewriter for the job.

Aid Quality — General Electric Co.'s Everett, Mass., foundry takes Polaroid pictures of questionable

areas of large castings. The prints are filed as a reference for future designs.

This problem confronted a producer of delicate components: Consignees were breaking tiny parts while unpacking shipping crates. The producer took pictures of each packing step and stuck them onto the crates. Damage costs were slashed.

Aid Sales — A heavy equipment dealer photographs new and used machines as soon as they arrive in the shop and sends pictures to prospects the same day. Deals often can be closed via telephone.

A. O. Smith Corp., Milwaukee, makes giant blowups of products in use which serve as background for show exhibits. Minneapolis-Honeywell Regulator Co., Minneapolis, sends dealers a photo of all equipment needed to make a heating survey—it serves as a checklist.

Training—A machine shop takes Polaroid photos of tooling setups. They're cataloged and used to show a new man how to set up for a job or to refresh the memory of the experienced employee.

Tackle Problems — Researchers wanted to record millimicrosecond actions during detonation processes and hypersonic ballistic studies. Librascope Inc., Glendale, Calif., built a camera for the purpose.

Ansco Div. of General Aniline & Film Corp., Binghamton, N. Y., found a need for color photography where bright light is prohibited. It perfected a tungsten film which does the job with illumination equivalent to that of one match.

Do Other Jobs — Microfilming, lofting engineering drawings on metal, and photographing blueprints and records to save space are rapidly growing applications.

Missilemakers use photography for tracking, photogrammetry (making maps from pictures), and record keeping. Gordon Enterprises, North Hollywood, Calif., which sells 90 per cent of its production to industry and government, looks for a 30 per cent sales increase this year—largely due to the missile program and expanding uses by airplane people.

Showing good potential: 1. Superfast color films. 2. Microphotography. 3. Ballistic uses. 4. Research and product development applications.

Photo Firms Report:

Sales Rise Despite Foreign Competition

(Equipment only, in millions of dollars)

	Sales	Imports	Exports
1957	395	28.4	34.7
1956	380	23.3	37.7
1955	342	15.8	33.1
1954	307	13.4	28.2

Sources: Department of Commerce and STEEL.

MAKERS of photographic equipment have a formula for setting sales records in the face of heated foreign competition: Keep out in front technologically, bring out new products, and find new applications.

"Most new ideas and development work in photography originate in the U. S.," says William C. Babbitt, managing director, National Association of Photographic Manufacturers, New York. He adds: The large U. S. market allows producers to install the most efficient equipment, keeping costs competitive with cheap-labor countries.

Outlook—The industry stands a good chance of setting another sales record this year. Eastman Kodak Co., Rochester, N. Y., says it's making "intensive efforts to keep business moving forward in 1958." It will "offer a substantial number of new products and broaden sales and advertising programs to reach more potential customers." Says Eastman's president, Albert K. Chapman: "We believe that 1958 should prove to be a good year."

Adds Robert C. Berner, executive vice president, Keystone Camera Co. Inc., Boston, Mass.: The slight recession has slowed our growth but has not stopped it. We expect to set another record in 1958 just as we have in each of the last ten years.

Rivalry—The industry has bettered its sales record in each of the last three years. But the competition of foreign firms is getting stiffer every year.

U. S. Department of Commerce reports that $40,966,973 worth of photographic goods was brought into the country in 1957—a 27 per cent increase over the 1956 mark. Biggest gains came in film, dry plates, and paper. Imports of still picture cameras and parts jumped 20 per cent.

Japan shipped in the most cheap cameras. West Germany is the biggest rival in cameras valued over $10 (it sent $8.8 million worth into the U. S. in 1956), but Japan is enlarging her share of that market. The United Kingdom, East Germany, and Switzerland are other big competitors.

Makers Grow — Booming sales have forced photo equipment producers to expand their production facilities. Examples: Graflex Inc., Rochester, N. Y., moved into new quarters last year where it is making audio-visual equipment along with its old lines. Bell & Howell Co., Chicago, which has set a sales record in each of the last seven years, is enlarging facilities. Photostat Corp., Rochester, N. Y., recently moved into 50 per cent larger quarters.

Sidelights — Vectron Inc., Waltham, Mass., one of 12 U. S. firms that specialize in making cameras to customer specifications, looks for a 50 per cent sales increase this year. Its volume jumped 40 per cent last year.

Tayloreel Corp., Rochester, N. Y., estimates that the 24 firms which make reels, cans, and cases for the photo industry, buy $120,000 worth of steel annually.

About 2 billion pictures were made by amateurs in 1957—640 million were in color . . . Women snap 55 per cent of the total . . . Sales of photo lamps hit $49.5 million in 1957, says *Photo Dealer* magazine.

Supervisor Pay Up

Increase was 5.2 per cent in 1957, American Management Association survey shows

PAY for first line foremen, general foremen, and office supervisors rose an average 5.2 per cent in 1957, says the American Management Association.

Annual salaries for all types of office supervisors and first line foremen range from $4000 to $9100. Pay for general foremen falls between $6400 and $13,300, the association reports in its third annual survey of supervisory management compensation.

Participants—The survey covers more than 8600 supervisors in 129 companies. Almost 6600 are first line foremen; 1350 are office managers; and about 700 are general foremen. About 50 kinds of supervisory activities are included. They range from accounting to maintenance.

Companies studied represent 46 different categories of industry and business, with the majority in manufacturing. Their sales range from less than $5 million to over $500 million. Employment varies from less than 500 to more than 10,000.

Problems—Rates paid vary with responsibility, complexity of work, and number of employees supervised—the average ranges from 10 to 15 to over 200.

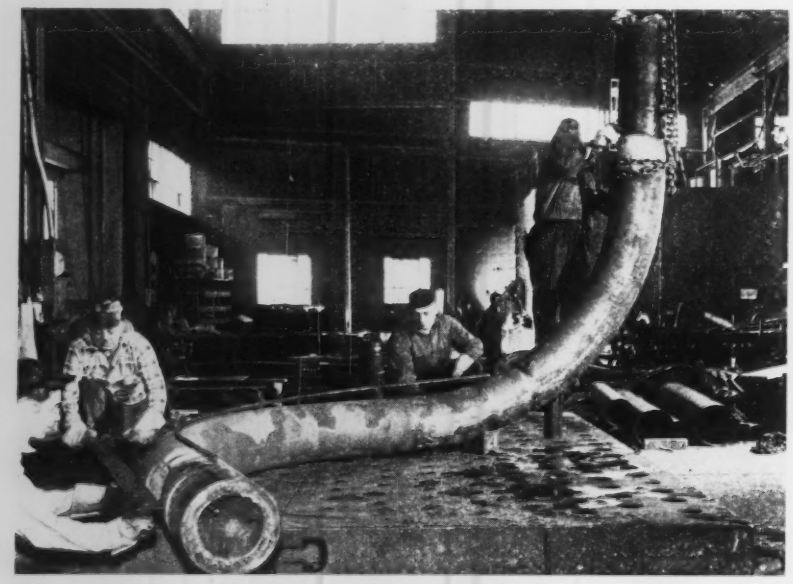
In compensating these people, the survey notes, companies must maintain adequate wage differential between supervisors and those being supervised.

Diesels Take Over

Modernization and improvement of U. S. railroad facilities since World War II cost nearly $14 billion, says Robert S. Henry, vice president of the Association of American Railroads. Conversion to the more powerful and flexible diesel locomotive accounted for almost a third ($4.5 billion) of that sum. It went for the purchase of about 24,000 diesels.

The first diesel-electric locomotives were put in service by American roads in 1925. By 1929, they had 22 in service. Locomotives, mostly of the steam type, then totaled 57,571.

Class I roads have more than 30,000 locomotives in service today. More than 27,000 are diesels—they handle over 92 per cent of our freight train and passenger service.



SERPENTINE TWIST OF SEAMLESS TUBE will soon serve Tennessee Valley Authority's Johnsonville, Tenn., station as a boiler feed discharge line. Water at 2300 psi and 493° F will flow through the tube. It's part of a complete piping system by Blaw-Knox Co., Pittsburgh

Britons Pay Less

British steelmakers reduce prices in domestic market. Export tags will remain the same

BRITISH STEELMAKERS have lowered prices to domestic users for the first time since 1939. Reductions average between 1 and 1.5 per cent and range from 1 per cent for heavy plates to almost 3 per cent for tin plate.

The cuts result from a drop in the cost of imported iron ore, a sharp decline in ocean freight rates, and a reduction in imports of pig iron and scrap (due in part to increased British production of pig iron).

Results—British steel users will save about $2.8 billion annually. Automakers alone will cut their costs about $300 million.

Savings in material costs and improved production techniques in the British steel industry allowed the $2.8 billion savings to be passed on to consumers, say industry sources. The British steel industry is worried about being nationalized should the Labor party be returned to power at the next election. It hopes other industries will follow its lead and lower prices as requested by the British administration.

Tight Money—Some industries in England using steel are struggling with the recession, too. Money is tight and capital expenditures have had to be curtailed on structural projects. But demand is strong for structural steel and plate mills have still not caught up with demand.

Exports—Export prices are unchanged but that business is not expanding. Steelmakers are experiencing difficulty in acquiring new export business because of the steel surplus in other parts of Europe and price cutting by producers in other export markets.

Others—Machine tool manufacturers in Britain are still operating below capacity but the situation has improved measurably during the last six months. Railroads are still buying steel for conversion programs (steam locomotives are expected to disappear by 1963).

The National Coal Board is still buying large tonnages of steel for production of machinery for underground mining.

Aluminum To Recoup

Today's situation offers chance to develop new applications, says president of Canadian firm

"THE ALUMINUM INDUSTRY is in a position where supply exceeds demand, and some expansion programs are being retarded," says Nathanael V. Davis, president, Aluminium Ltd., Montreal, Que.

Speaking before the New York Society of Security Analysts, Mr. Davis called the industry situation "a more normal state of affairs than has existed for many years."

Nothing has happened to change his opinion of long term potential of aluminum. Mr Davis says: "Conditions today provide an opportunity . . . to develop increased uses and applications for the metal."

Alcan—About 75 per cent of Aluminium Ltd.'s consolidated assets are represented in the facilities of the Aluminum Co. of Canada Ltd., Montreal.

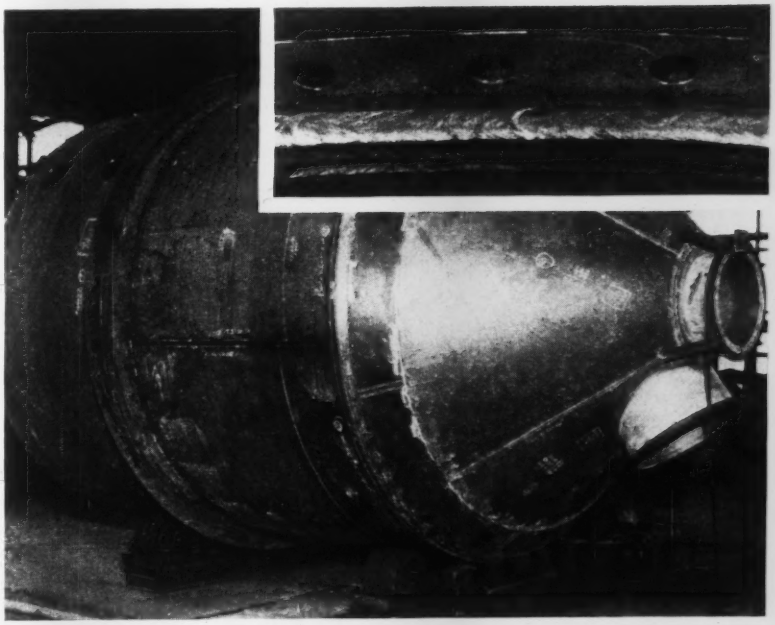
Much of this concentration is explained by the company's ability to develop its own hydroelectric power in Canada, says Mr. Davis.

Alcan's present smelting capacity is 590,000 tons annually (40,000 tons higher than it was in 1954).

Hydroelectric facilities are being developed in Quebec. Mr. Davis estimates that by the end of 1959 his company will have over 4.5 million hp of installed hydroelectric capacity in Canada. It can support primary aluminum capacity of 1 million tons.

Outlook—"There have been some recent signs indicating consumption of primary aluminum has stabilized, although the level (in some markets) is appreciably below a normal trend line," he said. While not attempting to set up a schedule, Mr. Davis went on to predict an inevitable return to more normal growth rates.

Mr. Davis claims that applications have been retarded by recent low prices of some other metals, but he thinks the situation will right itself when normal price relationships return. "Aluminum's future is in applications which the average person takes for granted as a part of normal, peacetime, everyday living," he concluded.



This evaporator body illustrates versatility of new wire. Cylinder is nickel-clad steel. Cone-shaped end is nickel. Nozzles are nickel with carbon steel flanges. Inset shows weld quality

Inco Develops Welding Wire

Nickel-cobalt base electrode joins most combinations of dissimilar metals with high quality welds. Best results expected with inert gas methods

MAKERS of liquid oxygen bottles and similar low temperature containers are expected to hail Inco-Weld A, a new welding wire being shown this week at the American Welding Society's annual show in St. Louis. It's designed to weld 9 per cent nickel steels that are tougher at low temperatures (minus 300° F) than the steel plates.

The maker, International Nickel Co. Inc., New York, says:

1. The wire will handle 95 per cent of today's dissimilar metal combinations.
2. Deposits are strong (they'll stay strong at high temperatures, too) and corrosion resistant.
3. Welds have x-ray quality.

Direction—The important market, observers say, will be in those industries that require vessels made of dissimilar metals. Typical applications: Nuclear power plant devices; processing, chemical, and petroleum plant equipment.

International Nickel engineers feel that Inco-Weld A will sell heavily to companies that use inert gas welding. Reasons: Speed, efficiency, control simplicity, and all-round welding quality.

Formula—The wire is an extension of the Inco-Rod A idea, which has been out about three years. (Today's counterpart is called an Inco-Weld A electrode.) Composition is mainly nickel-cobalt with substantial parts of chrome, iron, and other metals.

Another — International Nickel is also introducing Inco-Hard "1," an electrode which puts a hard protective surface on low alloy steels or cast irons. Its main purpose is abrasion resistance. Two layers produce a surface that is between 650 and 700 Brinell.

Post-Easter Congress Will Be Oratorical

CONGRESSIONAL ACTION until June will probably be limited to an oratorical rehash of the recession. Leaders of both parties will be consolidating their followings for certain nonrecession issues which must be solved before the legislators go home for fall campaigns.

With highways and housing out of the way before Easter, other antirecession measures (such as increased unemployment compensation, more public works spending, and individual tax cuts) may not come up until the go-home fever strikes after Independence Day. Administration forces hope to postpone major recession decisions until then. Democrats are willing to let them as long as the recession appears to be a lengthy one.

Big issues Congress must handle soon: The defense budget and reorganization of the Pentagon, reciprocal trade, foreign aid, corporate and excise taxes. Any one could take several weeks of debate in either house, so party leaders want to use the next two months as a breathing spell while preparing for solid action this summer.

Unlikely this summer will be any significant legislation on labor matters. The issue is too explosive when election time is so close.

Reaction To Highway Speedup

With the pay-as-you-go provision eliminated from the Highway Act until fiscal 1961, expenditures for the interstate system will run $1.1 billion more in 1959 and 1960 than originally planned. Because the bulk of that ($900 million) will come in fiscal 1960, observers generally are discounting the antirecession effects of the new bill. Some think it could be a dangerous inflationary factor in the revitalized economy of the early '60s.

Unless the moratorium on pay-as-you-go policies is extended past fiscal 1960, the extra $1.1 billion will have to be deducted from authorizations after that. It would tend to put the interstate program on a start-stop footing. Neither manpower nor equipment could be used effectively. Those disadvantages, think highway proponents, may force future Congresses to drop the pay-as-you-go feature completely, although that is by no means certain.

Baruch: Inflation Is Issue

Early this month, Bernard Baruch did his best before the Senate Finance Committee to get Congress back on the trail of inflation. Linking rising defense spending and taxes to inflation, Mr. Baruch named it "the greatest single peril to our economic health."

Conservatives on Capitol Hill are applauding the timing of Mr. Baruch's appearance (just before Congress' Easter recess). They hope his words reach the public in time to calm recession psychology. If Congress comes back to Washington believing the country wants pump priming for the immediate problem instead of solid long range economic thinking, warn the conservatives, the economy could be set back severely by burdening the taxpayers of the '60s with some hair-raising deficits from the late '50s.

'59 Defense Budget Up $1.5 Billion

Here's a breakdown of the President's supplemental request for defense funds in fiscal 1959: 1. $180 million for the Advanced Research Projects Agency (space and antimissile missile programs). 2. $218 million for Army missiles. 3. $518 million for Air Force missiles and aircraft. 4. $208 million for Navy ships (including conversions to missiles). 5. A whopping $109 million for Navy research, $28 million for Army research, and $9 million for Air Force research. 6. $23 million for Navy aircraft. 7. $104 million for Navy ordnance and ammunition. 8. $50 million for AF aircraft and missile support.

Two additional Polaris firing submarines and 40 B-52s account for over half the supplemental funds. New missiles like the Nike-Zeus, Polaris, Titan, Minuteman, and Hound Dog also benefit. Missing: Added funds for the Snark, our only operational intercontinental missile. Defense spending in fiscal '59 will probably pass $40.5 billion.

Space Plans Are Set

The National Advisory Committee for Aeronautics will be replaced by the National Astronautics & Space Agency with a doubled budget for fiscal 1959. President Eisenhower's answer to demands for a civilian agency to run our space program seems certain of Congressional approval. How it will work with Defense Department's Advance Research Projects Agency won't be determined until Congress finishes with the President's proposals for revamping the Pentagon's organization.

Where we stand today: The Army has approval to go ahead with one or two moon shots; the Air Force can try three. The Army will use its Jupiter C and the Air Force will rely on a Thor-Vanguard system. Experts think we may have a satellite going around the moon in 1959. Another program: A dummy reconnaissance satellite this year and the real thing next year (it's a Lockheed project for the Air Force). The Titan is scheduled to launch a 1 to 3 ton satellite sometime in the future. The AF is reportedly requesting permission for a manned satellite project, separate from the X-15 project, to be started this year.

McKay ROLLER LEVELERS

. . . From Tin Plate to Ship Plate

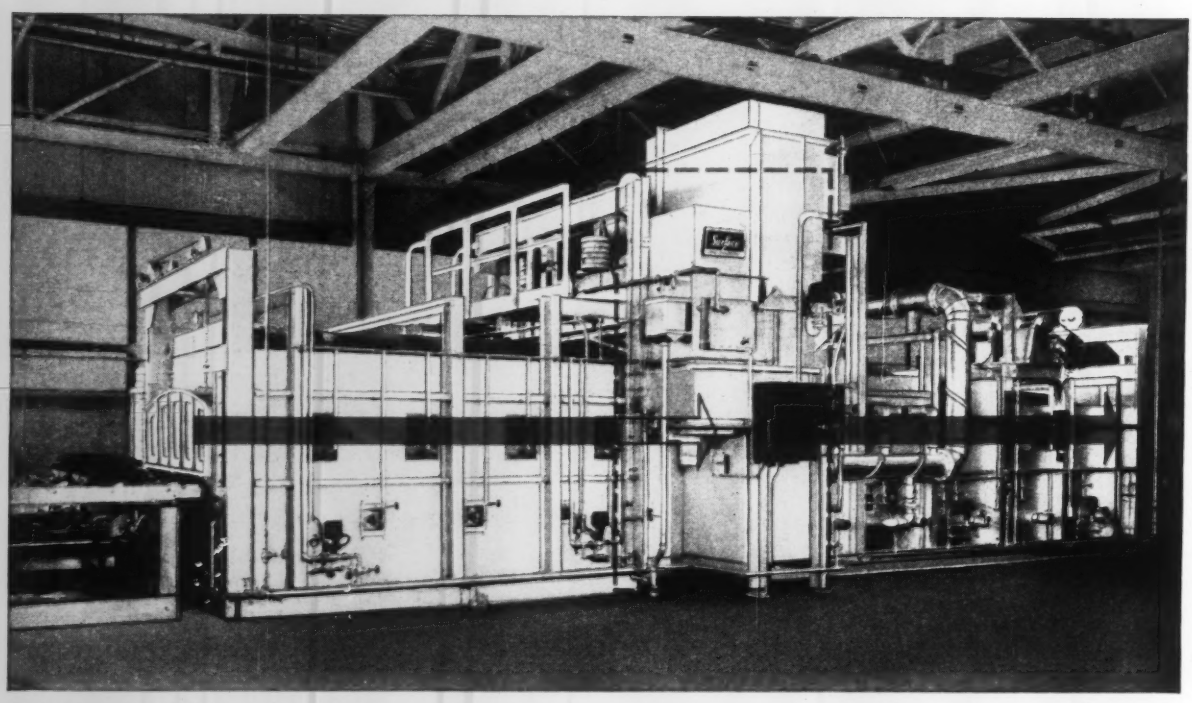
Tin cans and super-tankers have more in common than cargo space — the flat steel of which they're made had to be roller leveled. Regardless of the product — cans, cars, planes, appliances or ships — more fabricators will tell you that the "buy-word" in roller levelers is McKay. Write for Bulletin 100, or call for a McKay Application Engineer today.

THE McKAY MACHINE COMPANY
Youngstown, Ohio

McK

SETTING THE STANDARDS OF QUALITY METAL WORKING MACHINES FOR TWO GENERATIONS

Superfast cooling for cycle annealing



A furnace-within-a-furnace makes this Surface cycle annealer one of the most versatile heat treat units in the country. It anneals, cycle anneals, and normalizes gear forgings of different size, shape, and alloy at the net rate of 864,000 lbs. per month or better.

Such exceptional versatility is achieved by a superfast cooling zone. Really a full convection furnace within a direct-fired furnace, this zone is isolated by refractory doors. It can be used or by-passed, depending on which of many cycles the customer wants. As a result, the customer can heat treat as many as 13 different alloys in this one furnace.

Adding to the flexibility of the furnace is a modular tray design. Each module is an 18x20-inch chrome alloy casting. Modules can be combined to hold any size of work up to 800 pounds. They are also used to carry work outside the furnace.

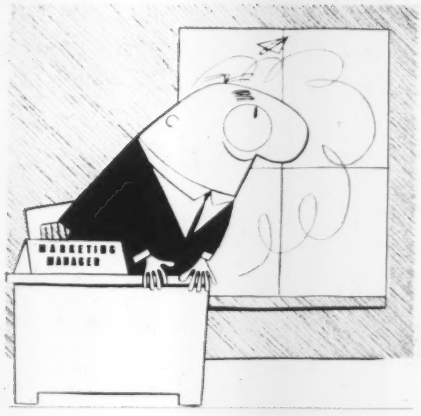
This furnace-within-a-furnace is another proof that Surface engineers are old hands at creating new ideas in heat treating.

Write for Bulletin SC-146 on cycle annealing.

Surface Combustion Corporation, 2385 Dorr St., Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

Surface

wherever heat is used in industry



Market managers get ready for new sales outlets as . . .

Metallic Fuels Become Vital

IF BORON-BASED FUELS can be made operational, about 5000 tons of boric oxide equivalent will be required in 1959, says Donald R. Gibbons of Arthur D. Little Inc., research laboratories, Cambridge, Mass.

Big things could stem from such a modest start (5000 tons is only 0.015 per cent of U. S. production), Mr. Gibbons told the American Institute of Mining Engineers. He predicts: If test flights are successful, about 30 high performance bombers using boron-based fuels will be built by 1965.

"If each plane uses these fuels only 25 per cent of the time, the bomber group will take about 150,000 tons annually. It would generate an annual market for 150,000 tons of boric oxide (45 per cent of current U. S. production)," he estimates.

Boron-based fuels have an average boron content of about 45 per cent.

Reason—Performance of missiles or aircraft is roughly proportional to energy output per unit weight of fuel. Conventional fuels have an energy content of about 18,000 Btu per pound, vs. about 25,000 per pound for boron-based fuels.

Here's what might be expected from boron-based fuels: 1. Range increases up to 50 per cent. 2. Payload increases when range is not paramount. 3. Increased speed with ordinary payloads. 4. Elimination of flame-outs at high altitude since such fuels burn easily even where oxygen is at a minimum. 5. Greatly increased engine thrust.

How They're Made—At the request of the government, Olin Mathieson Chemical Corp. and Callery Chemical Co. are building two prototype production plants. Operation should begin by early 1959. Initial capacity of the two plants will be about 3400 tons annually.

Boron-based fuels are produced by combining borax, hydrogen, and hydrocarbons under special conditions. When diborane (two atoms of boron and six atoms of hydrogen) is subjected to heat, higher boron hydrides are formed. They, in turn, are reacted with a hydrocarbon (probably ethylene), explains Mr. Gibbons.

Solid Fuels—Callery Chemical is working on a boron-carbon-hydrogen compound in solid rocket-propellent form.

"The need to develop a solid fuel to power our ballistic missiles is so vital that failure could spell the difference between survival or destruction," says Kenneth M. Bartlett, president, Horizons Inc., Cleveland research organization.

Liquid fuels and oxidants require excessive fueling time and a complex system of pipes, valves, and other equipment to generate and pump the liquids at the launching site. Missiles using them cannot be fueled in advance.

Danger — Since ballistic missiles travel at speeds of Mach 10 or more, a 6000-mile flight could be negotiated in less than 1 hour.

"Even if information on the launching and projected flight of the enemy missile were received immediately, we would still be fueling long after it landed," says Mr. Bartlett. "With solid fuel propellents, we could launch antimissile missiles and destroy enemy missiles far from our shores."

Other Metals—Boron is not the only metal being investigated for use in high energy fuels.

A spokesman for Dow Chemical Co., Midland, Mich., declares magnesium is superior to boron in thrust potential. In his opinion, it would be suitable where short range and high acceleration are crucial.

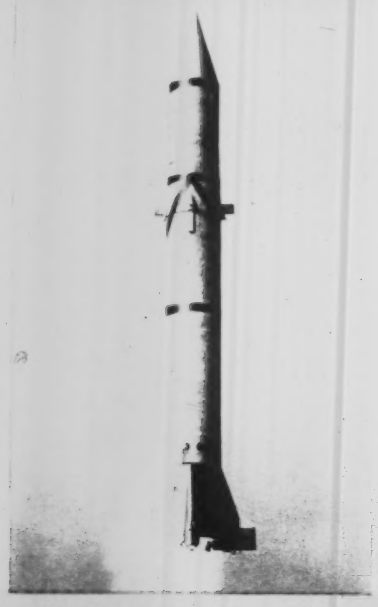
Additional support for magnesium comes from Phillips Petroleum Co., Bartlesville, Okla., a major producer of solid rocket propellents. It operates Air Force Plant 66, McGregor, Tex. Says Phillips: "In certain combinations, even the heavier metals such as aluminum and magnesium may be used advantageously as sources of heat for low molecular weight gases that will be expanded in the jet nozzle."

Will Close Open Hearths

Worcester Works, American Steel & Wire Div., U. S. Steel, will suspend open hearth operations at its Worcester, Mass., plant by July 1.

About 350 of the firm's 3100 employees will be affected by the shutdown. Billets from Fairless Works, Morrisville, Pa., will be used by Worcester's rod and wire-finishing mills. Four open hearths (each has a capacity of 115 tons) will be dismantled.

The action leaves Washburn Wire Co., Phillipsdale, R. I., the only ingot producer in New England.



REDSTONE

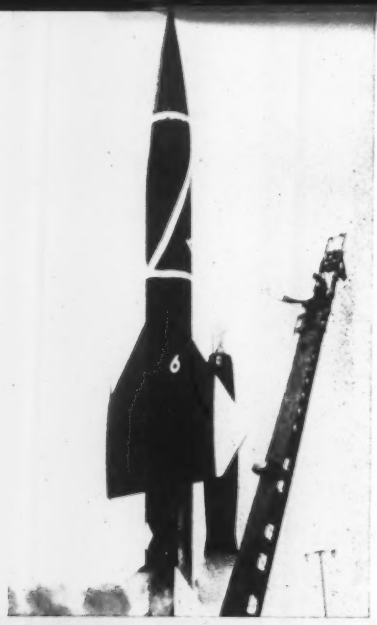
Aluminum—About 4500 lb in sheets, structurals, pipe, and tubing.

Copper—775 lb of wire.

MATADOR

Aluminum—About 5000 lb in sheets, honeycomb foil, extrusions, forgings.

Magnesium—Exact poundage undisclosed, but uses are significant.



BOMARC

Aluminum—1500 lb of sheets, forgings, and extrusions.

Magnesium—230 lb of magnesium-thorium sheets, extrusions, and castings.

Nonferrous Role in 'Birds'

NONFERROUS metals are playing a vital role in the U. S. missile program.

Virtually every missile contains one or more members of the nonferrous family in amounts varying from entire skin structures to small components in electronic mechanisms.

What It Means—Few producers think the market will take big tonnages in the next few years. Two reasons: 1. Many birds are still in research and development or just getting into production. Even full production probably won't call for the quantities of metals that manned aircraft do. 2. Uses are limited because an estimated 90 per cent of take-off weight is propellent.

Most companies expect to share in the present market. Even though the business isn't in the volume category, they feel that they are gaining valuable data and experience for the coming space age.

Specs—For the most part, structural considerations which determine choice of materials are about the same for manned aircraft and missiles. One difference: Materials used in manned aircraft operate at relatively stable temperatures. A missile material is exposed to a wide range of temperatures.

Structural and component materials may be subject to temperatures ranging from −320° F to the searing heat of re-entry. A missile metal's properties at low and elevated temperatures are important.

Much of the information on nonferrous uses is classified. But here are a few of the metals and some of their applications.

Aluminum

It's believed that there is some aluminum in all the 34 missiles in the U. S. arsenal. Makers say it is used because of: 1. Its lightness. 2. Its ease of fabrication, which makes quantity runs possible. 3. Its resistance to high compression loads and radical temperature changes. 4. Its corrosion resistance.

Some applications include:

Redstone—About 4500 lb of aluminum are in the ballistic shell (see STEEL, Jan. 20, p. 66). Some uses: The tail section, including fins and rudders; the center section, which contains the fuel tanks; the front section, which contains the guidance system; fuel tank bulkheads; stiffener rings; internal braces; internal piping and tubing.

Jupiter-C—This missile also takes about 4500 lb. Uses parallel those of the Redstone with these exceptions: The nose cone for the first stage is also aluminum, as is the bucket for the spin launcher for the upper stages.

Corporal — Booster components take an estimated 4000 lb, including sheets, plates, forgings, extrusions, and castings.

Matador—Some 5000 lb of sheets, honeycomb foil, extrusions, and forgings are used.

Dart—Aluminum accounts for 5 per cent of over-all weight. Uses: Motor head, wing spars, wing spoilers, and bobbin pods.

Lacrosse—Major aluminum uses (accounting for 50 to 60 per cent of over-all weight) are in the wings, tail surfaces, structural body,

SNARK

Magnesium—4000 lb in sheets and castings.
Copper—Quantity undisclosed, but uses are of prime importance.

brackets, and frames.

Mighty Mouse—Fins are forged aluminum. Weight: Two lb per missile.

Rascal—Uses 3200 lb of tapered plates, sheets, ring forgings, and extrusions for wings, fins, hull skin, motor, wing roots, and wing components.

Thor—Sheets and plates are used in the skin, fuel tank, fuel lines, and bulkheads.

Tartar—Aluminum usage is about 19 per cent by weight and includes extruded tube shell, forgings and castings for structural parts, and forgings for fins.

Bomarc — This bird has a gross firing weight of 8500 lb. It uses 1500 lb of aluminum sheets, forgings and extrusions for the hull skin, wing and tail skin, fuel tank, and motor components.

Magnesium

This metal is used primarily to save precious airframe pounds. One missilemaker estimates that each pound of airframe weight saved is worth $5000 to $10,000; that value is hiked geometrically as you move forward on the missile; in the extreme forward (payload) area, the value per pound goes into the six figures.

Magnesium-thorium is also used because it has good strength at 450 to 750° F.

Some missiles using the metal:

Falcon—Sheets, extrusions, forgings, and diecastings comprise more than 90 per cent of outer structure. More advanced versions are expected to use magnesium-thorium alloys.

Bomarc — This missile contains more than 230 lb of magnesium-thorium sheets, extrusions, and castings (about one-third of the airframe area).

Polaris—Present design calls for about 25 per cent magnesium by weight. Usage is expected to increase. Magnesium-thorium sheets and plates are getting strong consideration.

Regulus II—This unit uses 784 lb of sheets and castings, including what is said to be the largest thin-wall magnesium casting ever poured.

Snark—Magnesium is a major structural material. More than 4000 lb of sheets and castings go into the missile.

Other birds using the metal include: Nike-Ajax, Nike-Hercules, Nike-Zeus, Talos, Tartar, Terrier, Atlas, Jupiter, Matador, Regulus I, Thor, Titan, and Vanguard.

Beryllium

This metal has some missile applications, but its exact uses are classified. N. W. Bass, Brush Beryllium Corp., Cleveland, says his firm expects missiles to become an increasingly important market. One possible indication: The Air Materiel Command recently awarded Brush a $330,000 contract to increase its sheet rolling capacity.

Why beryllium is used: 1. Its stiffness (50 per cent stiffer than steel). 2. Its lightness (one-third lighter than aluminum). 3. Its resistance to oxidation. 4. Its high heat capacity. 5. It is readily machinable to precise dimensions.

Titanium

This metal is believed to have widespread application, but few details have been released by the Defense Department.

It has uses in the giant Atlas and the small Sidewinder, which has only about a dozen moving parts.

The Atlas uses a titanium alloy (6 per cent aluminum, 4 per cent vanadium) in helium storage bottles—they help control propellent flow into combustion chambers (see STEEL, Mar. 17, p. 48).

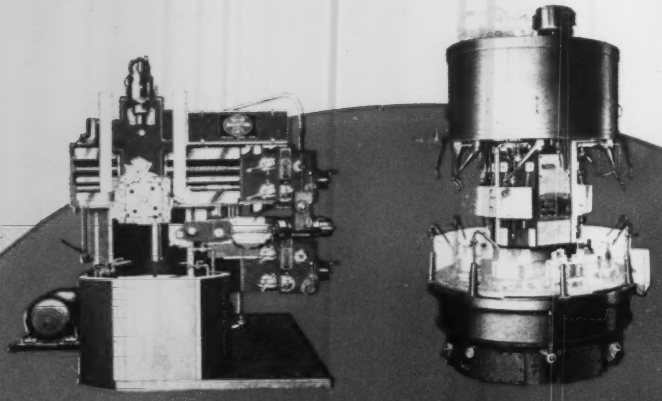
The metal is used in the Sidewinder's impellers and the Vanguard's nose cone.

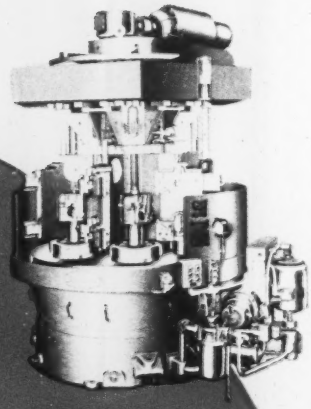
Chief advantages: 1. Weight savings (it's 50 per cent lighter than steel). 2. Strength at high and low temperatures. 3. Corrosion resistance.

Copper

Little information on copper has been cleared. It's felt that uses, while important, take relatively little metal. One missilemaker says: "Copper is used primarily in electrical and electronic harnesses and printed circuits. Beryllium copper is the most prevalently used alloy. It goes into many electronic and mechanical components that are critical in missile performance factors." Another company says its use of copper and copper-base alloys is limited to bearings and wirings.

The metal is believed to play an important part in the Snark. Some 775 lb of copper wire are used in each Redstone.





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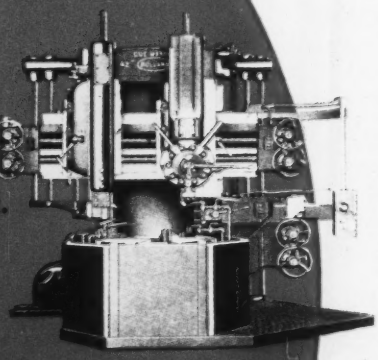

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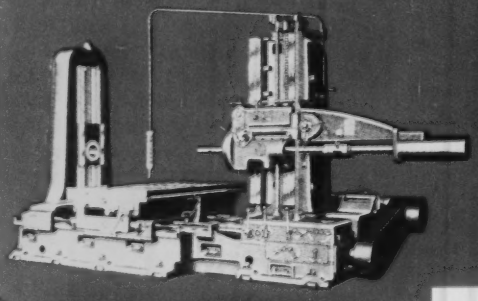

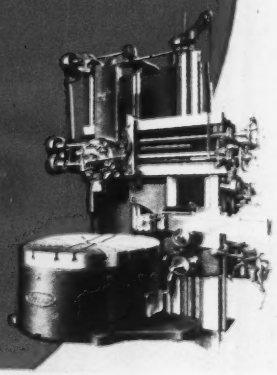

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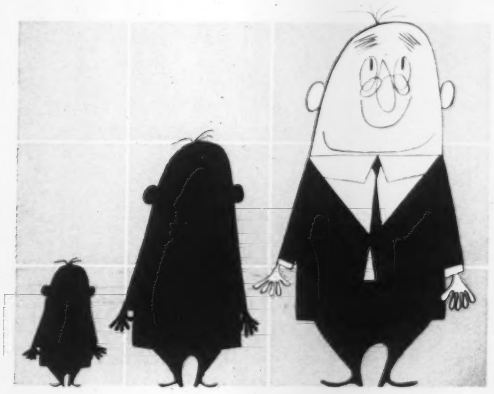

Engineers Gain Stature

They've stopped confining their thinking to technical matters and are delving into economics. Ample evidence of the trend comes from a recent SAE meeting

AUTOMATION engineers are adding a new dimension (economics) to their thinking. The trend was in evidence at the recent national production and forum meeting of the Society of Automotive Engineers at Chicago. During discussions of automatic assembly and in corridor talk, engineers delved into such subjects as:

- How to plan for automation.
- Understanding automation's hidden costs.
- Education for automation.
- Most important to the engineers: "Will automation pay for itself?"

Revelation — While such topics may be old hat to many management people, it's significant to find engineers talking that way. Only a few years ago the interest of the average engineer in automation was likely to be: "How can we automate it?" not "What will it cost?"

T. R. Timm, master mechanic at General Motors' Buick Div., sums up the new outlook when he says: "The important thing is to evaluate the product: Will it last for three, five, or seven years? When you have to change a machine in a short time, the cost will be 60 to 80 per cent of the original cost. That means crash tooling; perhaps standby tooling. Under such circumstances, the most important thing is to see whether it will pay to mechanize."

Plan—As engineers become more aware of costs, they're also more interested in another management problem—planning for automation. The men who have to do the work pretty generally agree that a project group should co-ordinate design, purchase, and installation.

They claim the group can be centralized or decentralized, depending on the size of the operation, but it must have authority to make final decisions on equipment purchases and installations. Project groups must consider flexibility of the equipment, obsolescence rates, and cost comparisons with other types of equipment, say the engineers.

Hidden Costs—Another clue to the growing savvy of automation engineers comes from their comments about indirect losses that crop up if mechanization isn't carefully planned.

"We lost our shirts a couple of years ago because we had to purchase standby machines when we switched over a transfer line," says one engineer. His SAE colleagues agree that they should include the extra costs of standby equipment when considering automation.

They also point out it's wise to consider the problems of handling in-process inventory and possible benefits of saving on floor space with well designed standard layouts. Greater use of standardized parts, particularly plug-in electrical components, saves maintenance, say the engineers. That cost area sometimes cropped up after the systems were installed—not before.

Standards—Even work standards are being more closely scrutinized by engineers. One maker of auto frames records idle time for each machine in a line. A provision is written into the labor contract so when line production is stepped up through engineering changes, the company has the right to make workers meet the higher rates.

By totaling idle time each day and checking it against the standard rate (capacity of the slowest machine in the line), the company comes up with an optimum hours comparison. That shows the line's potential and pinpoints areas where output can be boosted.

Education—Casting a keen eye on a problem which normally might be handled by training or personnel people, engineers recognize the need to educate personnel who will run automated equipment.

Best way to do that: Bring foremen into the picture earlier, often in first design stages, say the engineers. They'll take an interest in what's being done and will be more eager to work out bugs when the equipment reaches the floor.

Summary—Management has been aware of these areas for some time. What's important is that engineers now recognize them, too.

It means metalworking companies can give engineers responsibility for designing, selecting, and purchasing

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First Quarter Production Totals

	1958 CARS	1957 CARS	1958 TRUCKS	1957 TRUCKS
GM*	692,662	831,810	92,480	113,319
Ford	337,682	544,828	59,923	84,109
Chrysler*	157,663	370,044	13,369‡	22,560‡
AMC*	41,183	24,702	.....	.....
S-P*	9,520	19,213	1,737	3,159
Totals	1,238,710	1,790,597	167,509	223,147

*U. S. only. ‡Dodge trucks.

automated equipment. Top management will be free for other tasks.

Exhaust Notes

• GM's Delco-Remy Div. is producing an alternating current generator for commercial vehicles which was field tested on GM buses. It can continuously turn out 215 amperes at cruising speed and 125 at idle. The unit is totally enclosed, brushless, has built-in silicon rectifiers, is oil cooled, and controlled by a transistor regulator. It presumably can be adapted for automobiles.

• Willys Motors Inc., Toledo, Ohio, reports it has sold its Shadyside (Ohio) Pressed Metals Div. to Metropolitan Stamping Co., a subsidiary of International Harvester Co. Willys purchased the press equipment of the Beverly Avenue Pressed Metals Div. of Jarecki Corp., Grand Rapids, Mich. It will be shipped to Brazil and used in building Jeeps at Willys' affiliated plant in Sao Paulo.

• Jaguar has introduced an XK 150 Roadster in the U. S. It has the Jaguar XK 6-cylinder engine (210 hp, British rated) and is equipped with four-wheel disc brakes, roll-up windows, one-piece windscreen, and a disappearing convertible top. Also available is a combination sports and competition model, the SK 150 S, with higher power and torque rates that give it 250 hp at 5500 rpm. Torque output on the S model is 240/4500 rpm.

• Argonaut Corp., Cleveland, will add a second limousine to the line it will introduce this spring (STEEL, Mar. 17, p. 58). Intended for state occasions and executive use, the car boasts a 154-in. wheelbase.

• Factory sales of passenger cars from U. S. plants the first two months of 1958 totaled 874,637, compared with 1,198,068 in January-February, 1957, reports the Automobile Manufacturers Association. Comparable figures for trucks: 150,883, vs. 182,884.

• AMC says Rambler sales in the first six months of its fiscal year starting Oct. 1, total 62,189 units, compared with 36,786 for the like period a year earlier.

• To counter Chevrolet's price claims in advertising, Ford Motor Co.'s Ford Div. has made cuts of $15 to $16 in the suggested list prices of six Fairlane models. Prices now are just under those of similar Chevrolets. To offset the reductions, Ford has boosted the price of its Cruise-O-Matic transmission $10.80 and has made the smaller 292 cu in. engine standard on station wagons and Fairlane 500s.

• Chevrolet has built its 38 millionth car. The figure also represents more than 60 per cent of the 61 million cars built by GM since it was formed in 1908.

• At least one auto manufacturer is closely investigating the possibility of using a semihydraulic air spring filled with nitrogen instead of air. This may foreshadow the ultimate trend suspension systems will follow.

• Chrysler Corp. has a military design contract to develop a series of intermediate trucks and a flying utility vehicle for the Army. This research vehicle must travel at speeds up to 50 miles per hour, remain airborne for several hours, and carry up to 1000 lb of weapons or equipment. No details are available, but Detroit observers were alerted when an object that looked like a rotor blade broke loose from a Chrysler test stand and was hurled into a nearby yard. Helicopters maybe?

• Volvo of Sweden plans to introduce a smokeless diesel truck in the U. S. The company says the smokeless operation is based on the throttle being linked to the air intake instead of the fuel pump. A vacuum governor controls fuel metering, and the engine cannot be flooded. A perfect and smokeless mixture results. Incidentally, Volvo expects to sell 15,000 cars here this year—double 1957 sales and 30 per cent of the firm's annual capacity.

U. S. Auto Output

Passenger Only

	1958	1957
January	489,357	641,591
February	392,112	571,098
March	357,049	578,826
3 Mo. Total	1,238,518	1,791,515
April	.....	549,239
May	.....	531,365
June	.....	500,271
July	.....	495,629
August	.....	524,354
September	.....	284,265
October	.....	327,362
November	.....	578,601
December	.....	534,714
Total	.....	6,117,315

Week Ended	1958	1957
Mar. 8	83,892	140,161
Mar. 15	86,447	141,038
Mar. 22	80,560	138,646
Mar. 29	93,844	130,233
Apr. 5	65,082†	130,318
Apr. 12	68,000*	126,194

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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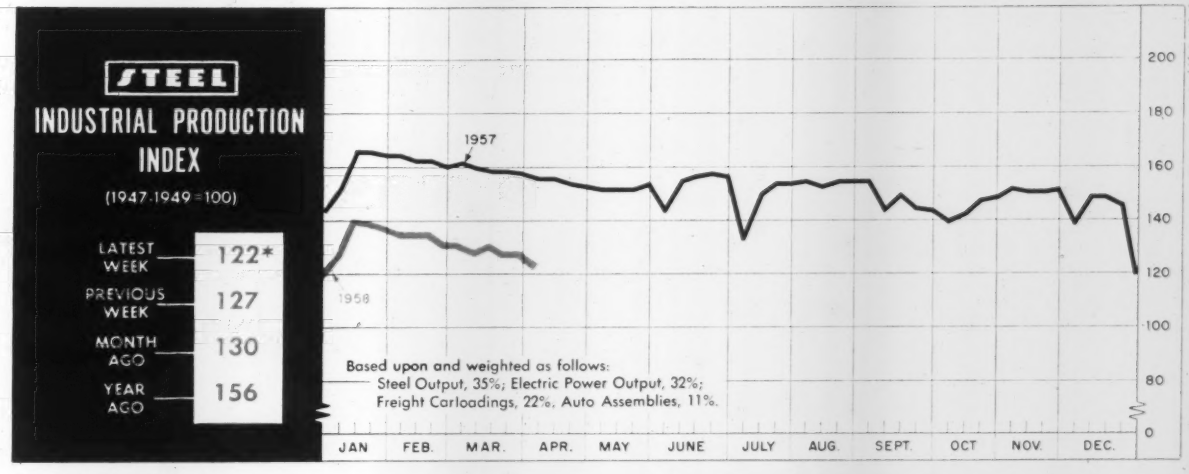

*Week ended Apr. 5.

Recession Patterns Show Bottom Is Near

SCOUTING the business game this year is even more risky than trying to conjure up the starting lineups for the baseball season openers. The safest bet is to take a look at the records for a clue. In that light, the recession resembles the 1953-54 version.

If the pattern continues, April will mark the leveling off point; it will be followed by comparative stability through September; recovery will start in the last half of October.

Not Foolproof—Don't hold your breath until that happens because there is no guarantee it will. So far, this downturn has had enough peculiarities to defy exact classification by past standards. But when you compare the 1953-54 and 1957-58 recessions, here is what you find:

They both followed three to four years of steady industrial and commercial expansion. Both started in September, defying the expected fall upturn. In 1953-54, about two-thirds of the plunge came before the turn of the year. This time, about half came before and half after the New Year. Both seemed to lose their momentum by the eighth month—if you side with the many businessmen who feel that we are now on bottom.

Only a few forecasters see any chance of a recovery before the fourth quarter of this year, which would again parallel 1953-54.

Bigger Dip — Within the last month, the current recession has surpassed its predecessor in depth. From its beginning to the lowest level (for a holiday-free week) the 1953-54 drop was 15.4 per cent (21 points on STEEL's index). Through the week ended Apr. 5, the current index plunged 21.3 per cent beneath the level of late August—this includes the unexpected large drop of 5 points to a preliminary 122 (1947-49=100) during the week ended Apr. 5.

Strictly on the basis of experience, there should be a slight bulge appearing in the trend line this month or next, but it will be far less than

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,306[1]	1,312	2,310
Electric Power Distributed (million kw-hr)	11,600[1]	11,645	11,693
Bituminous Coal Output (1000 tons)	7,220[1]	7,440	10,570
Crude Oil Production (daily avg—1000 bbl)	6,250[1]	6,264	7,600
Construction Volume (*ENR*—millions)	$398.5	$441.2	$281.5
Auto, Truck Output, U. S., Canada (*Ward's*)	81,909[1]	111,509	154,214
TRADE			
Freight Carloadings (1000 cars)	525[1]	532	644
Business Failures (Dun & Bradstreet)	327	357	290
Currency in Circulation (millions)[3]	$30,636	$30,524	$30,588
Dept. Store Sales (changes from year ago)[4]	+2%	−4%	−8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,382	$22,359	$22,712
Federal Gross Debt (billions)	$272.6	$273.0	$274.9
Bond Volume, NYSE (millions)	$18.7	$21.6	$19.4
Stocks Sales, NYSE (thousands of shares)	8,638	10,856	9,741
Loans and Investments (billions)[4]	$89.8	$90.5	$85.6
U. S. Govt. Obligations Held (billions)[4]	$28.1	$28.3	$25.2
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	227.41
STEEL's Nonferrous Metal Price Index[6]	195.9	199.1	239.1
All Commodities[7]	119.6	119.8	117.0
Commodities Other than Farm & Foods[7]	125.9	125.9	125.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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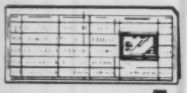

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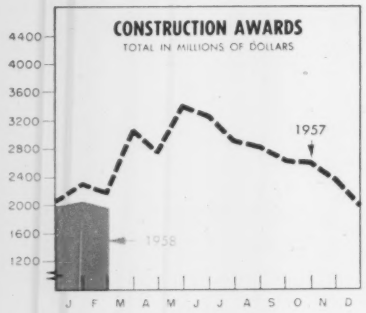
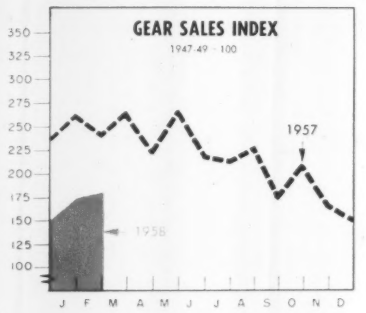


	Total		Building	
	1958	1957	1958	1957
Jan.	2,066.1	2,299.6	1,536.2	1,730.7
Feb.	1,953.4	2,161.0	1,478.1	1,695.5
Mar.	.....	3,078.0	.....	2,199.7
Apr.	.....	2,776.4	.....	2,069.7
May	.....	3,399.5	.....	2,416.8
June	.....	3,243.5	.....	2,341.5
July	.....	2,900.7	.....	2,247.6
Aug.	.....	2,818.0	.....	2,291.8
Sept.	.....	2,624.9	.....	2,092.2
Oct.	.....	2,613.8	.....	2,075.6
Nov.	.....	2,370.7	.....	1,808.5
Dec.	.....	1,982.3	.....	1,457.5
Totals	.....	32,268.4	.....	24,427.1

F. W. Dodge Corp.



	1958	1957	1956	1955
Jan.	174.5	259.3	245.5	140.9
Feb.	179.1	239.5	256.2	148.5
Mar.	....	262.4	276.5	172.8
Apr.	....	221.7	264.7	179.8
May	....	263.2	275.6	205.2
June	....	215.9	245.4	193.5
July	....	211.4	286.7	201.7
Aug.	....	225.8	219.5	217.6
Sept.	....	174.9	230.5	246.5
Oct.	....	207.0	299.8	227.6
Nov.	....	165.3	216.2	210.4
Dec.	....	150.8	235.7	245.5
Avg	....	216.4	254.4	198.3

American Gear Mfrs. Assn.

Charts copyright, 1958, STEEL.

most analysts consider normal. Even in 1954, there was a rally of sorts—about 4 per cent—between May 1 and July 1.

Steel Still Sliding—Steel production has disappointed everybody and will continue to do so for several months. While inventories are being worked off at a fast pace, orders are still dropping, keeping the inventory-order ratio at a high level (see below). Steel output will not be a strong upward force in the economy for some time.

Electric energy production this month and next will continue to slide off gently according to seasonal patterns. An upturn will set in during June which will continue through the summer, although it will probably be mild compared with those of some recent years.

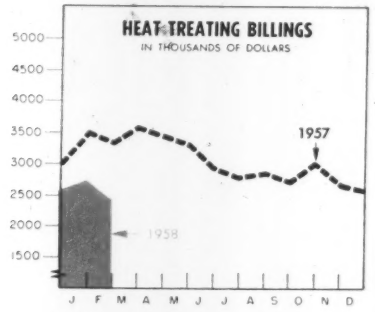
Freight car loadings have been slipping a little in each of the last five weeks. Unless production of goods picks up, this gentle downtrend will continue until the ore season opens, which will be later than usual this year. But when that happens, the index should get a welcome lift.

Up and Down Autos—During the first week in April, a 30,000 unit reduction in auto-truck output accounted for 3 of the 5 points the index dropped. The following week was expected to pick up moderately. But with motordom on an on-again-off-again schedule, it probably will cause an erratic pattern in the production index until the third quarter. Only a strong uptrend in spring sales can stabilize this segment of the economy.

Maybe June—IF steel production firms up in the next six weeks and IF auto producers manage to smooth out production, chances are good that a mild improvement will appear in June, as it did in the spring of 1954.

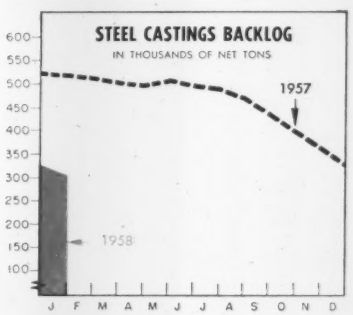
Inventory Ratios Rise

Manufacturers' inventories continue to drop but not fast enough in relation to the volume of new orders. In February, stocks of durable goods dropped from January's $30.6 billion to $30.2 billion, the monthly report from the Office of Business Economics reveals. On a seasonally adjusted basis, it appears that new orders did not slip as much, moving less than 1 per cent from $10.7 billion to $10.5 billion. But the raw figures show that they are still falling off faster than inventories. At the end of February, the ratio of durable goods inven-



	1958	1957	1956
Jan.	2,780.4	3,533.9	3,116.4
Feb.	2,436.4	3,378.9	3,124.8
Mar.	.....	3,571.6	3,330.9
Apr.	.....	3,462.6	3,166.2
May	.....	3,311.4	3,350.7
June	.....	2,912.1	3,094.5
July	.....	2,767.5	2,737.4
Aug.	.....	2,830.8	3,136.6
Sept.	.....	2,708.8	2,858.6
Oct.	.....	3,021.6	3,468.5
Nov.	.....	2,641.4	3,238.2
Dec.	.....	2,565.4	2,998.9

Metal Treating Institute.



	Shipments		Unfilled Orders*	
	1958	1957	1958	1957
Jan.	120.7	169.2	304.9	519.6
Feb.	....	154.9	....	511.8
Mar.	....	160.1	....	503.4
Apr.	....	162.5	....	497.6
May	....	164.6	....	505.0
June	....	153.6	....	494.3
July	....	122.0	....	489.4
Aug.	....	145.9	....	471.2
Sept.	....	139.0	....	438.5
Oct.	....	146.4	....	395.9
Nov.	....	127.1	....	362.9
Dec.	....	120.8	....	327.3
Totals	....	1,766.1		

*For sale. U. S. Bureau of the Census.

tories to new orders stood at 2.96, compared with only 2.29 a year earlier and 2.61 in December.

The sharp cutbacks in production have resulted in a decline in the inventory-sales (production) ratio since December, but at 2.35 it is still above the year-ago figure of 2.23. Even though the inventory adjustment so far has been severe, it appears that some further cutbacks or a marked pickup in orders (and subsequently production) will have to take place before this recession is safely out of the woods.

Why Income Is Holding Up

One Federal Reserve System economist commented a week ago that despite the recession, Americans are eating better than ever. Food store sales are at an all-time high, partly because of higher prices but mainly because of higher consumption.

The National Industrial Conference Board partially explains the high level of spending in its study on unemployment compensation coverage. Today, there are about 1.5 million more workers covered by state unemployment insurance systems than there was during the last recession. NICB figures that from August, 1957, through last February, the economy lost $1.5 billion (seasonally adjusted) in wages and salaries. But, about 30 per cent of that was recovered from unemployment benefits.

Construction Roars Back

Led by private mass housing activity, engineering construction contracts during the week ended Apr. 3 reached the 1958 high of $598.5 million, says *Engineering News-Record*. It was the first time since December, 1956, that weekly contracts topped the $500 million mark. For the first 14 weeks of the year, contracts trail those of the corresponding 1957 period by 9 per cent.

Average Hourly Cost Climbs

Although steel production is less than 50 per cent of capacity, average hourly payroll costs continue to inch upward. In February, steel workers received an average of $3.088 an hour, vs. $3.042 in January. A reduction in the workweek (from 35.1 to 34.2 hours) and lower total employment (from 575,300 to 554,300) cut the total payroll from $297.6 million in January to $261.7 million in February.

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CONN L. CLIFFORD
purchasing dir. at Buick

WILLIAM A. REICH
GE Metallurgical Products post

DAVID S. GIBSON
Worthington v. p.-purchasing

ALBERT J. BERDIS
Weirton Steel president

Conn L. Clifford was named director of purchases, **Buick Motor Div.**, Flint, Mich., General Motors Corp. He succeeds **Floyd J. Compson,** retired. **J. D. Delesie** succeeds Mr. Clifford as assistant purchasing director.

William A. Reich was appointed manager, engineering section, of **General Electric Co.'s** metallurgical products department in Detroit. He was manager of advance engineering, and has specialized in fields of powder metallurgy, high temperature alloys and nonferrous casting. He now is responsible for all Carboloy cemented carbide engineering operations.

Merle W. Kremer was appointed vice president, parts division, **Sylvania Electric Products Inc.**, at Warren, Pa. He continues as general manager of the division. **Gerald L. Moran** was appointed vice president, chemical and metallurgical division, at Towanda, Pa., continuing as general manager.

Ernie A. Schmidt, midwest regional sales manager, was elected commercial vice president of **I-T-E Circuit Breaker Co.**, Philadelphia. He continues midwest sales management.

Fred I. Courtney, executive vice president, was elected president of **Virginia Metal Products Inc.**, Richmond, Va.

Milt O. Luft was made assistant to the Chicago district sales manager, **United States Steel Corp.** He was resident salesman for the corporation in Des Moines, Iowa.

David S. Gibson was elected vice president-purchasing, **Worthington Corp.**, Harrison, N. J. Effective May 1, he will succeed **John J. Summersby,** retiring. **Thomas F. Griffin,** currently purchasing manager, Holyoke, Mass., division, will succeed Mr. Gibson as general manager of purchases.

Fred C. Foy, president, **Koppers Co. Inc.**, Pittsburgh, assumes the dual position of president and chairman. **W. F. Munnikhuysen,** chairman since 1955, has retired.

Howard Goodman was elected president and chief executive officer of **Goodman Mfg. Co.**, Chicago. He succeeds **William E. Goodman,** who continues as chairman.

Paul M. Tunison was made director of engineering, **Judson L. Thomson Mfg. Co.**, Waltham, Mass. He was formerly chief engineer and works manager of Paramount Mfg. & Engineering Corp.

AC Spark Plug Div., General Motors Corp., Milwaukee, promoted **Bruce H. Schwarze** to director of engineering. He was chief engineer of military products. **Donald F. Ayres,** former project director for the Thor missile, was named chief engineer of navigation and guidance.

George E. Armington joined **Euclid Crane & Hoist Co.**, Euclid, Ohio, as vice president-engineering. Mr. Armington was a founder 27 years ago of Euclid Road Machinery Co., now a division of General Motors Corp. Most recently he was director of engineering for that company.

Albert J. Berdis was named president of **Weirton Steel Co.**, Weirton, W. Va., subsidiary of National Steel Corp. He succeeds **Edwin O. Burgham,** now chairman. Mr. Berdis was vice president-manufacturing, aluminum division, Olin Mathieson Chemical Corp.

Harry E. Gude was appointed vice president - manufacturing, aluminum division, **Olin Mathieson Chemical Corp.**, New York. He was general manager of the division's rolling mill, now nearing completion between Clarington and Hannibal, Ohio. Mr. Gude succeeds **Albert J. Berdis,** who becomes president of Weirton Steel Co.

T. L. Mellish was made manager, parts sales, construction machinery division, **Allis-Chalmers Mfg. Co.**, Milwaukee. **John Cresto** was made manager, parts sales, for the engine-material handling division.

B. Thomas Staley was elected vice president-sales, **Rock Island Bridge & Iron Works Inc.**, Rock Island, Ill. He has been connected with the engineering and sales department of the company since 1949.

Arthur F. Meyer was appointed Cleveland district sales manager for **Kaiser Aluminum & Chemical Sales Inc. Philip A. Gaebe** was made assistant eastern regional sales manager, Pittsburgh.

Donald H. Cravener Jr. was appointed plant engineer at the extrusion plant of **Reynolds Metals Co.**, Phoenix, Ariz. He was vice presi-

FRANK G. SORENSEN JR.
American Steel Foundries post

H. LEE BRANDENBURG
Hupp Aviation plant mgr.

CHARLES L. THOMPSON
Magnesium Co. gen. sales mgr.

JAMES W. MORTON
Eaton-Reliance Div. p. a.

dent-engineering for Ideal Tool & Mfg. Co.

Frank G. Sorensen Jr. was appointed plant superintendent at **Elmes Engineering Div.**, and **King Machine Tool Div.**, American Steel Foundries, Cincinnati. He was works manager of Cincinnati Gear Co.

H. Lee Brandenburg was named manager of the Greenville, Mich., operation of **Hupp Aviation Co.**, subsidiary of Hupp Corp. He was chief project engineer, special products division, Gibson Refrigerator Co., a Hupp division.

John F. Adamson was promoted to assistant chief engineer, American Div., **American Motors Corp.**, with headquarters at Kenosha, Wis. He succeeds **J. S. Voight**, retired.

C. L. West, formerly vice president, was named chairman of **Electric Furnace Co.**, Salem, Ohio. **F. Troy Cope Jr.** was made vice president-sales.

Charles L. Thompson was made general sales manager, **Magnesium Co. of America**, East Chicago, Ind. He was sales manager for aluminum extrusion and tubing, Reynolds Metals Co.; general manager, Buda Engine & Equipment Co.; and general sales manager of material handling equipment, Allis-Chalmers Mfg. Co.

Hyster Co.'s industrial truck sales organization, Portland, Oreg., consolidated district sales areas into geographical regions. New regional managers and their respective regions are: **John B. Hall**, eastern; **Jack Greer**, midwest; **Donald Shaffer**, western; **Robert W. Hill**, southern.

M. Mark Watkins was elected president of **Conoflow Corp.**, Philadelphia, subsidiary of Walworth Co. He was executive vice president. Mr. Watkins is also vice president of Remington Corp., Auburn, N. Y. **John C. Koch** was elected executive vice president of Conoflow. He was vice president-general manager.

James W. Morton, formerly senior buyer in **Eaton Mfg. Co.'s** axle division, was promoted to plant purchasing agent of the Reliance Div. in Massillon, Ohio. He succeeds **C. O. Gainey**, who has been given direct responsibility of inventory control (both production and supply storerooms).

J. I. Case Co., Racine, Wis., in forming a separate department to handle sales of its Utility wheel and crawler tractor line, appointed **William J. Schlapman** sales manager; **W. H. Vogel**, assistant sales manager. Both men were executives of Wagner Iron Works.

Hupp Aviation Co., Chicago, subsidiary of Hupp Corp., appointed **Lee G. Carlson** project engineer of its Hydroid line of hydraulic pumps.

Arthur J. Welch was appointed vice president-general manager, spring division, **Borg-Warner Corp.**, Chicago.

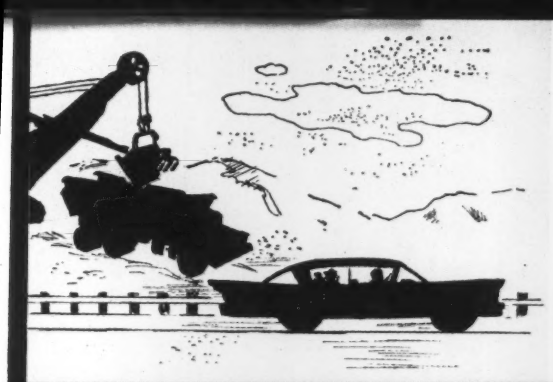
Theodore F. Cocks was made man-

F. TROY COPE JR.

C. L. WEST
new positions at Electric Furnace Co.

M. MARK WATKINS

JOHN C. KOCH
Conoflow Corp. president, exec. v. p.



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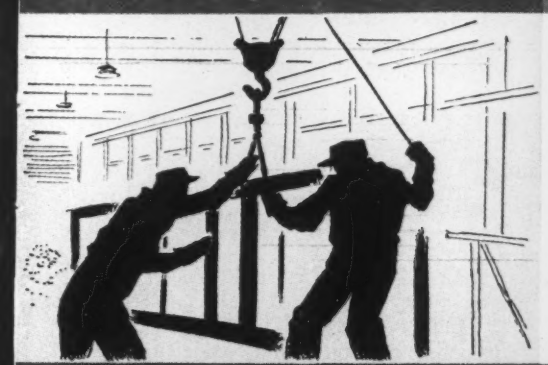

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DR. ROGER W. BURTNESS
Stewart-Warner division post

O. W. CARPENTER
Chain Belt president

HERBERT B. JOYCE
Lyon purchasing director

ager of a new district sales office of **Chicago Bridge & Iron Co.**, at Kansas City, Mo.

Dr. Roger W. Burtness was appointed manager of engineering and research of **Stewart-Warner Electronics**, a division of Stewart-Warner Corp., Chicago.

J. R. Hickam was named sales manager, **Webb Corp.**, Webb City, Mo. He was assistant engineer and sales engineer. Mr. Hickam succeeds **W. H. Perry**, now with Cardinal Scale Mfg. Co.

General Electric Co.'s communication products department appointed **Arthur F. Carl** manager of manufacturing engineering; **Robert W. Klimpel**, manager of advance manufacturing engineering. Both are in Utica, N. Y. **Harvey L. Turner** was made manager of crystal manufacturing operations, Clyde, N. Y.

Paul L. Weinman succeeds **James W. Schofield** as manager of **Armco Steel Corp.'s** Kansas City sales district.

John K. Knighton was named assistant sales manager, transmissions operations, Allison Div., **General Motors Corp.**, Indianapolis.

Tom McCracken was appointed to co-ordinate long-range production planning for the Air Force's T-38 supersonic jet trainer, under development by **Northrop Div.**, Northrup Aircraft Inc., Hawthorne, Calif.

Harlan M. Thorpe was appointed manager-quality control in **General Electric Co.'s** medium steam turbine, generator, and gear department, Lynn, Mass.

O. W. Carpenter was elected president of **Chain Belt Co.**, Milwaukee. He succeeds **L. B. McKnight**, now chairman of the executive committee. Mr. Carpenter was executive vice president.

Herbert B. Joyce was made director of purchases, **Lyon Inc.**, Detroit. He has held purchasing posts with Murray Corp., Detroit Hardware Mfg. Co., and Letts Drop Forge Inc.

Westinghouse Electric Corp. named **V. J. Cozzarin** manager of the Cincinnati repair and manufacturing plant. He is succeeded as manager of the Cleveland repair plant by **A. C. Del Col.**

Clem A. Kiener, regional sales manager, Columbus, Ohio, was named assistant general sales manager at the Hopkins, Minn., general offices of **Minneapolis-Moline Co.**, Minneapolis. **Roger R. Hipwell**, product manager, was named manager of advertising and sales promotion for the company to succeed **John Rusinko**, resigned.

W. W. Morgan was appointed manager, aluminum products, **Universal Steel Co.**, Cleveland. He was with Kasle Steel Co.

John P. Jansson joined the aluminum division of **Olin Mathieson Chemical Corp.**, New York, as manager, architectural sales. He had been executive vice president of the Aluminum Window Manufacturers Association.

District sales managers appointed by **Cleaver-Brooks Co.** are: **R. W. Watson**, Milwaukee; **Frank R. Goulding**, Atlanta; **R. E. Costin**, Dallas; **W. B. Stoehr**, San Francisco.

National Malleable & Steel Castings Co., Cleveland, established a new organization pattern, dividing sales and plant operations into two major line groups. **Wilson H. Moriarty** was named chief executive officer of the newly formed railway and mine division in addition to staff duties as first vice president of the corporation. This new group includes plants at Sharon, Pa.; Melrose Park, Ill.; the technical center in Cleveland; and international operations. **Stowell C. Wasson**, corporate vice president, was made responsible for staff services which include metallurgical research, process development, general purchasing, and similar operation services. He is assisted by **B. C. Yearley**, assistant vice president. Other officers of the railway and mine division are: **Mellor W. Stevenson**, vice president-sales; **Kenneth Selby**, vice president-engineering; **John F. Hutson**, assistant vice president-sales, Chicago. **Roy C. Hobson**, Chicago works manager, was made chief executive officer, vice president and general manager of the new industrial division, which includes plants at Cleveland, Chicago, and Indianapolis. **Mark Miller** was made vice president-sales, industrial division.

G. H. Hennegar was elected vice president of **Walter Maguire Co. Inc.**, New York. He continues to supervise market activities.

J. F. Carson was named production manager of the Des Moines, Iowa, implement plant of **Ford Motor Co.** He succeeds **W. R. Phillips**, who was made plant manager Jan. 1.

William R. Carlson was made press division district sales manager, New York area, for **E. W. Bliss Co.** He succeeds **L. R. Hills**, retired.

OBITUARIES...

John R. Stearns, 50, sales manager, valve division, **Eaton Mfg. Co.**, at Detroit, died Apr. 3.

George A. Anderson, 69, founder and former president, **Anderson Mfg. Co.**, Worcester, Mass., died Mar. 31.

Sheldon K. Towson, president, **Elwell-Parker Electric Co.**, Cleveland, died Mar. 28.

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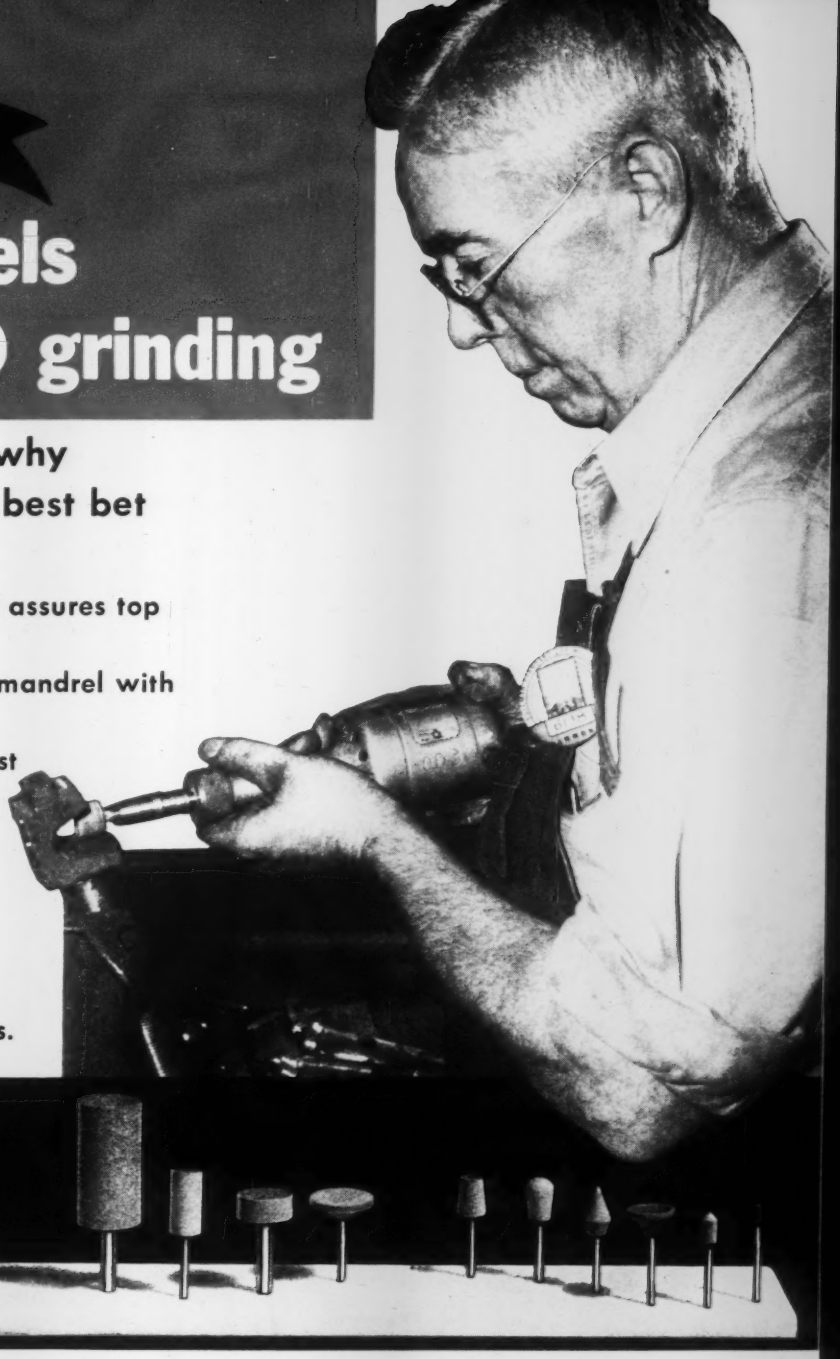

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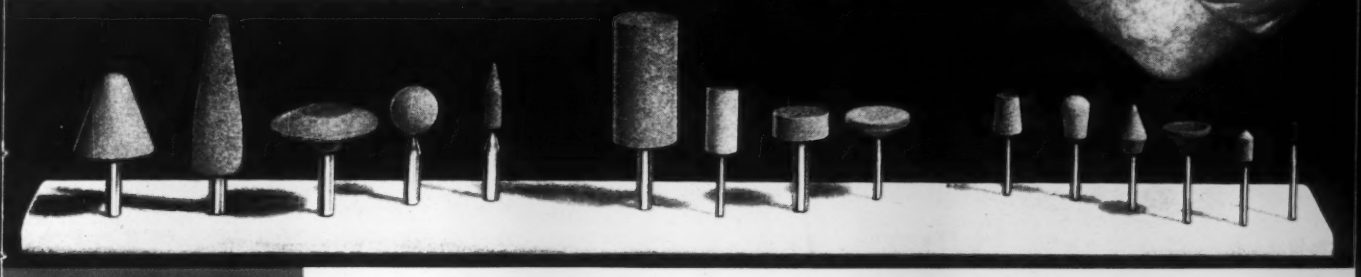

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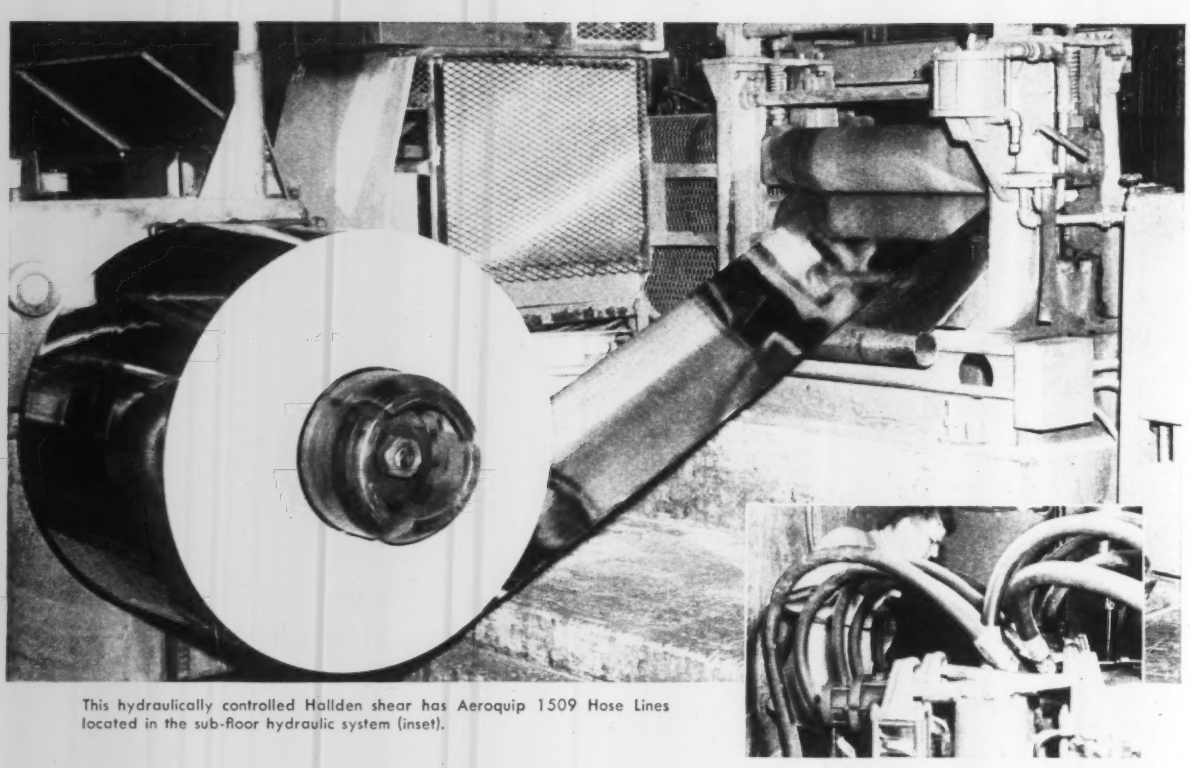
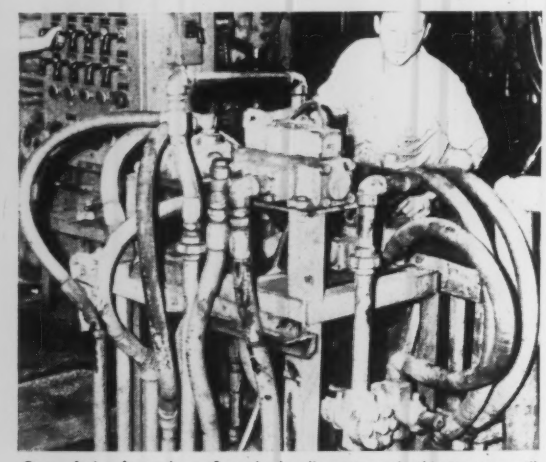


This hydraulically controlled Hallden shear has Aeroquip 1509 Hose Lines located in the sub-floor hydraulic system (inset).

Kaiser Steel Mill Uses Aeroquip Hose Lines



One of the few above-floor hydraulic systems is this temper mill installation. Aeroquip 1509 High Pressure Hose Lines shown have the flexibility to resist vibration and shock.

Fontana, California Strip Mill Has Flexible Hose Lines On All Hydraulic Systems

Flexible hose lines withstand shock and vibration, giving longer service life on equipment subject to these strains. At Kaiser Steel Corporation's Fontana, California strip mill, Aeroquip Flexible Hose Lines are used on all hydraulic systems. A minimum inventory of Aeroquip Bulk Hose and Reusable Fittings meets Kaiser's wide range of size and pressure requirements.

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New Wire Source

J&L division to start producing stainless line next month at new mill in Detroit

THE Stainless Steel Div. of Jones & Laughlin Steel Co. will make stainless steel wire when its new wire mill at Detroit begins operations next month.

The product will be available as coils or straight lengths in several sizes (0.0125 to 0.5 in.) and several finishes: Cold drawn, copper coated and cold drawn, special nonmetallic coatings, and centerless ground. Standard types of Grades 300 and 400 will be offered.

Applications—Uses include: Cold heading wire, spring wire, welding wire in smaller sizes, weaving wire, forming wire, rope wire, belt wire, and slide forming wire.

The wire will be fabricated into such products as nails and screws, auto radio aerials, clotheslines, dental tools, fishhooks, refrigerator trays, staples, and windshield wiper arms.

Sales—Construction on the new mill began in March, 1957. Its products will be sold through Stainless Steel Div. offices in Detroit, Chicago, Cleveland, Los Angeles, and Newark, N. J.

The Plant — Coils and rods of stainless steel from J&L's Detroit bar mill will serve as incoming material for the adjacent wire mill.

Equipment installed at the wire mill include: A Vaughn No. 4 Special Motobloc cold drawing bench; a Vaughn No. 22 Single Deck Motobloc cold drawing bench; two Hartform wire draw benches; one complete Drever copper coating line; two Lewis spin straighteners; one Micro Welder; and two Landis continuous pointers.

The equipment will be serviced by two, 5-ton, Browning overhead cranes; four, 500-lb wall jib cranes; two, 1000-lb floor jib cranes; and one 5-ton gantry. All were made by Industrial Crane & Hoist, Ingersoll Products Div., Borg-Warner Corp., Chicago.

Duplex Pipe Produced

Aluminum duplex pipe is being produced by Reynolds Metals Co. It is extruded in four sizes (1.5, 2, 3, and 4 in.) and is made in standard 30 ft lengths. It can also be ordered in nonstandard lengths from 3 to 40 ft. Duplex pipe, carrying steam in one line and process liquid in the other, is used primarily in handling liquids which solidify or become viscous upon cooling.

Synchrophasers Introduced

Hamilton Standard Div., United Aircraft Corp., has started quantity production of Synchrophasers for turbine engine propellers. They will be installed on Lockheed C-130B Hercules turboprop transports used by the Air Force. The Synchrophaser reduces noise and vibration within aircraft cabins by maintaining electronic control over angular relationship between propeller blades.

Perfects Marking Device

Jones & Laughlin Steel Corp. has started marking differentially coated tin plate so that a customer can easily distinguish between heavily coated and light coated sides. Operating at J&L's Aliquippa, Pa., Works, the marking method is similar to offset printing. Diamond shaped symbols are used.

Monitor System Installed

Systems Div., Beckman Instruments Inc., completed installation of a fully transistorized, automatic process monitoring system at the Casper, Wyo., refinery of Socony Mobil Oil Co. Inc. It is designed to monitor operation of a new catalytic reformer producing 3500 barrels daily of high-octane gasoline.

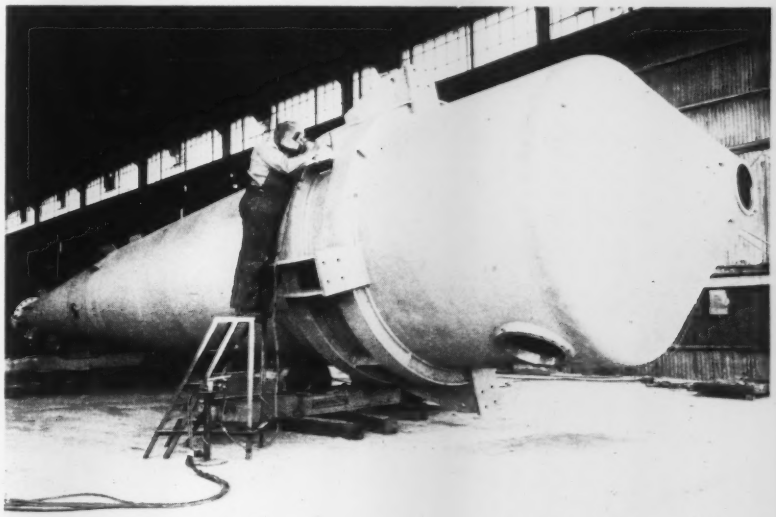
Build Skyscraper Columns

Under construction at Bethlehem Steel Co.'s Pottstown, Pa., Works are steel skyscraper columns for the new 60-story Chase Manhattan Central Office Bldg., New York. The columns will constitute about half of the 50,000 tons of structural steel required. Having maximum length of 36 ft and weighing up to 52 tons, the largest columns will support loads of more than 7000 tons.

New Atomic Sub Ready

The Navy's new atomic submarine, *Skipjack*, will be launched May 26 at General Dynamics Corp.'s Electric Boat Div., Groton, Conn. It is 250 ft long and has a

(*Please turn to Page* 116)



A TANK for use as a fuel reservoir in rocket engine systems gets its final welding. Made by Standard Steel Corp. for North American Aviation Corp., the unit is 45 ft long, has a diameter of almost 8 ft and a capacity of 9300 gallons. It weighs (empty) 31,000 lb and is made of stainless steel supplied by Allegheny Ludlum Steel Corp., Pittsburgh

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9. Realock Fence
10. Wickwire Springs
11. Wissco Perforated Metals
12. Claymont Fabricated Steel Parts
13. Gold Strand Insect Wire Screening
14. Claymont Flanged & Dished Heads
15. Claymont Carbon & Alloy Steel Plates
16. Claymont Large Diameter Steel Pipe

PRODUCTS *help on tough jobs!*

Today's builders are specialists who know how to get a difficult job done... and done economically.

No wonder you'll find these CF&I Products on so many construction jobs—for they help do the job swiftly, economically and safely.

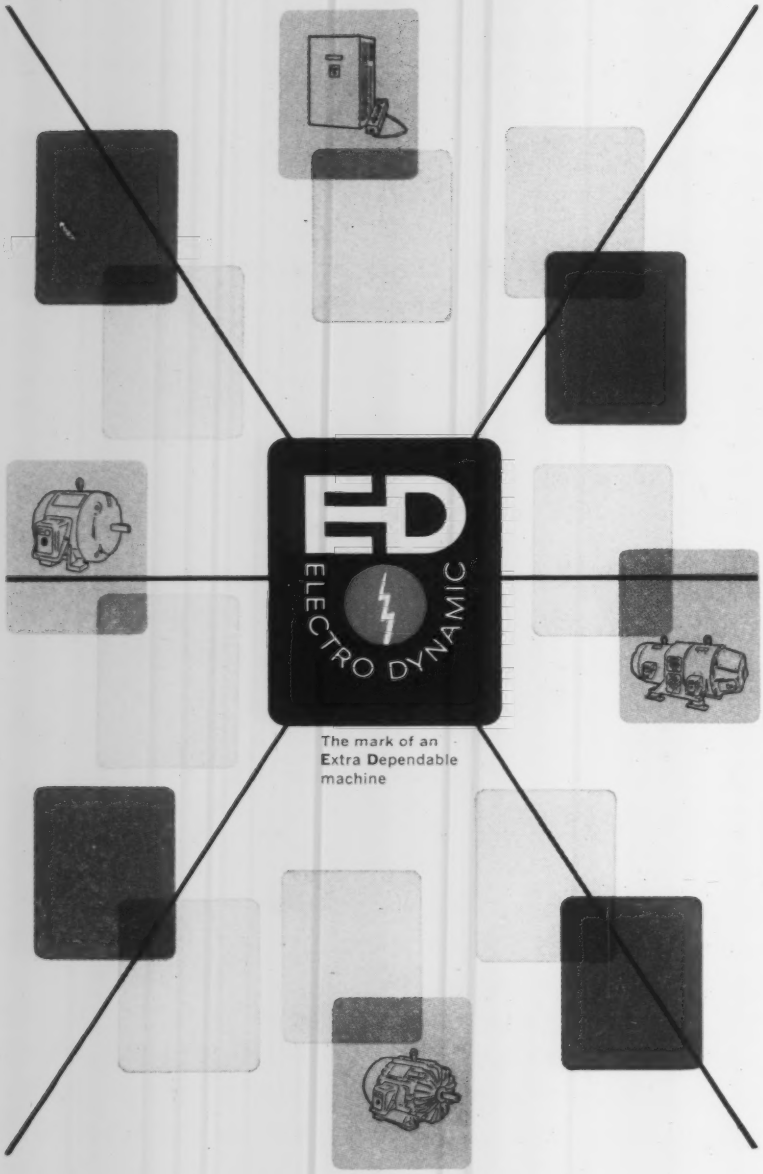
You, too, can use these CF&I Products to advantage on your bridge, road or other construction job. For full details, see your nearby CF&I representative.

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City San Antonio • San Francisco • Seattle • Spokane • Wichita

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Toronto



The mark of an Extra Dependable machine

What this symbol means

Like the brand name on other quality products you buy, the E.D. symbol on your electric motors means "The Best".

You know also that there is an E.D. expert nearby whenever you need him. Electro Dynamic's broad network of offices includes a chain of over 25 warehouses set up across the country to provide utmost speed of delivery to you.

Complete line of a.c. and d.c. motors from 1 to 300 h.p., Geared Motors, Selectrol and Selectron Variable Speed Drives and Motor Generator sets.

Telephone or write for Bulletin 50-A.

ED ELECTRO DYNAMIC
DIVISION OF GENERAL DYNAMICS
CORPORATION
BAYONNE, NEW JERSEY

GD GENERAL DYNAMICS

(*Concluded from Page 113*)

surface displacement of about 3000 tons. *Skipjack* is the third U. S. submarine to bear that name. All were built by Electric Boat.

NEW PLANTS

E. F. Houghton Co., Philadelphia, completed a new plant and laboratory facilities in Detroit. The new plant will supply additive-treated lubricants, cutting fluids of both petroleum and synthetic origins, drawing compounds, fire-resistant hydraulic fluids, rust preventives, heat treating salts, carburizers, hot forging agents, and quenching oils. The laboratory will exercise control over all processing.

Phelps Dodge Copper Products Corp. will build a $100,000 warehouse for its Birmingham branch. Completion is scheduled for Aug. 15. It will have 15,000 sq ft of floor space.

Electro-Autosizing Machine Corp. opened its new factory in Closter, N. J. The firm's former connection as a division of Industrial Gauges Corp. was severed, effective Jan. 31.

Handy & Harman Co. opened its new plant in El Monte, Calif. Designed for fabrication and recovery of precious metals and their alloys, it has an area of 25,200 sq ft.

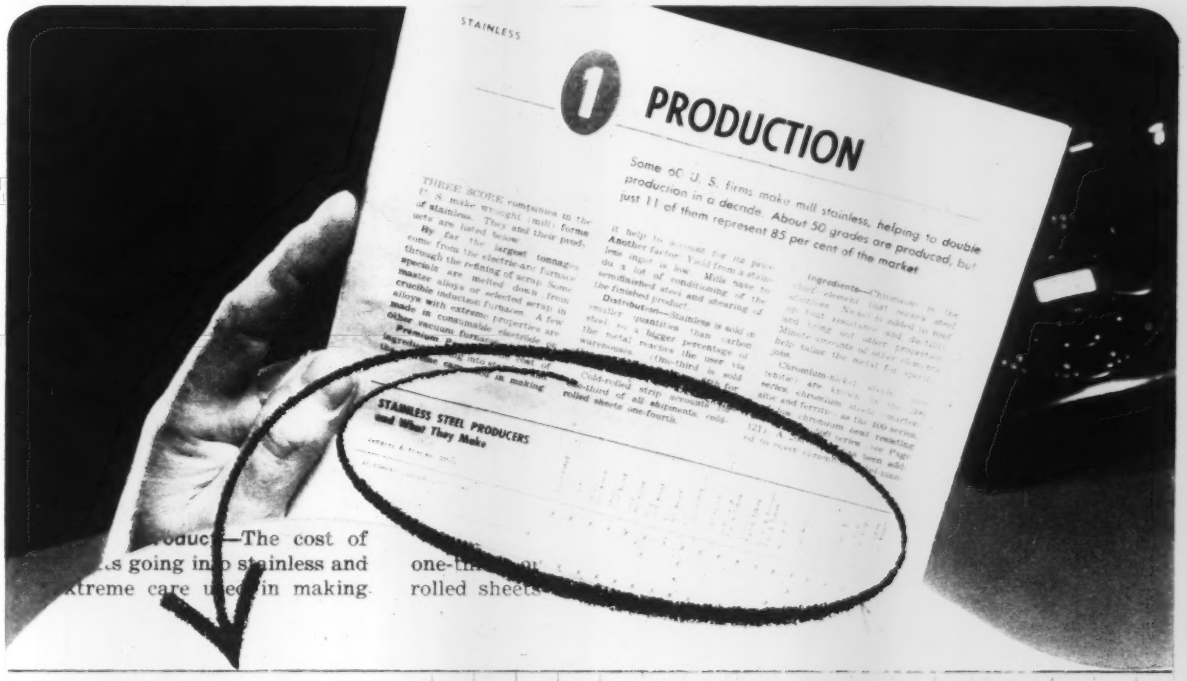
Youngstown Sheet & Tube Co. has a sintering plant under construction at its Indiana Harbor Works, East Chicago, Ind. When completed next spring, the plant will have a capacity of 4200 net tons of sinter product daily. Space is available for doubling capacity.

Hercules Powder Co., Wilmington, Del., will build a plant in Bacchus, Utah, for development and production of solid propellents for long range rockets and missiles. It will be adjacent to Hercules' present plant.

Kennecott Copper Corp. will begin construction of a $30-million electrolytic copper refinery in Anne Arundel County, Maryland. The plant will have an initial capacity of 16,500 tons monthly and is sched-

(*Please turn to Page 120*)

Experience**—the added alloy in **A-L Stainless, Electrical and Tool Steels


STAINLESS
1 PRODUCTION
Some 60 U. S. firms make mill stainless, helping to double production in a decade. About 50 grades are produced, but just 11 of them represent 85 per cent of the market
STAINLESS STEEL PRODUCERS and What They Make

STAINLESS STEEL PRODUCERS and What They Make Company & Principal Office	Semifinished	Plates	Sheets, Hot Rolled	Sheets, Cold Rolled	Strip, Hot Rolled	Strip, Cold Rolled	Bars, Hot Rolled	Bars, Cold Finished	Tube Rounds	Electricweld Pipe & Tubing	Seamless Pipe & Tubing	Mech. & Pressure Pipe & Tubing	Wire Rods	Drawn Wire	Extrusions	Stainless Clad Plates	Stainless Clad Sheets or Strip	Other, Including Structural Shapes
ALLEGHENY LUDLUM STEEL CORP. Pittsburgh	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
						X		X						X				

Of the 60 producers of stainless steel...

only ALLEGHENY LUDLUM makes all sizes, shapes, finishes and analyses

In its November 4, 1957 issue, STEEL magazine published a complete run-down on the stainless steel industry. This article reveals that *only Allegheny Ludlum*, of the 60 some companies making stainless, produces all sizes, shapes, finishes and analyses.

This can save you considerable time and money. When you make Allegheny Ludlum your *one* source of stainless, you work with *one* sales engineer—*one* order, whether you buy sheet, strip, bars, tubing or whatever.

And, at the same time, you get the best technical service. A-L's crack research and development department is continually searching for new alloys, and better ways to use today's. Its findings are freely available to you through sales engineers, technicians and special literature.

Allegheny Ludlum follows the product from the melt through to finished form, has greater quality control over the stainless you buy. And since A-L makes all forms of stainless, you get unbiased recommendations as to what is best for your individual needs.

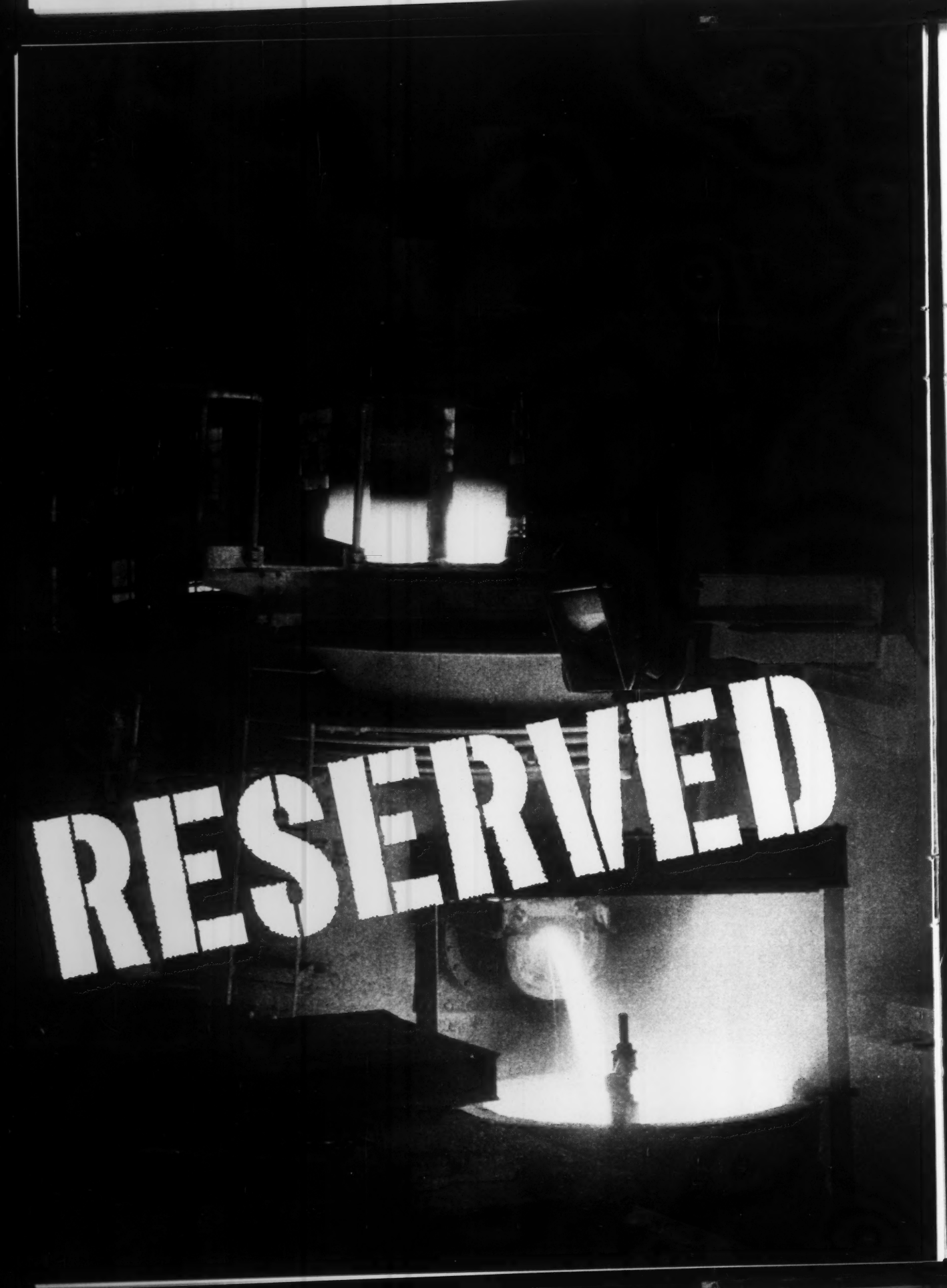
Profit by Allegheny Ludlum's status as the only one-source integrated supplier of all stainless forms. Call your A-L representative today . . . see how he can save you money and time. Or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*

ALLEGHENY LUDLUM

for warehouse delivery of Allegheny Stainless, call RYERSON

Export distribution: AIRCO INTERNATIONAL

EVERY FORM OF STAINLESS . . . . EVERY HELP IN USING IT


RESERVED

If you had your own steel mill, you could be sure of getting all the steel you need in peak demand periods, and you'd never have cash tied up in excessively large, costly-to-carry inventories. That's why Carpenter's new plan is . . .

like having your own steel mill

Here's a new solution to your steel inventory problems. This new plan lets you *reserve mill output ahead of time.*

It means:

1. *You don't have to carry more inventory than your rate of production dictates.* Result: your inventory expenses are always at a minimum. Cash that would ordinarily be tied up in inventories during low demand periods is free, when it can be most advantageously used.

2. *You have an assured supply of steel in peak demand periods.* Emergencies won't change the picture, because, under Carpenter's new plan, the mill carries extra large stocks of semi-finished steel in reserve. And if you order steel out of local warehouse stocks, this same plan assures continuous, dependable deliveries.

Increased capacity at Carpenter makes this new plan possible. Through the acquisition of electric furnace steelmaking facilities in New England, Carpenter has virtually doubled previous capacity.

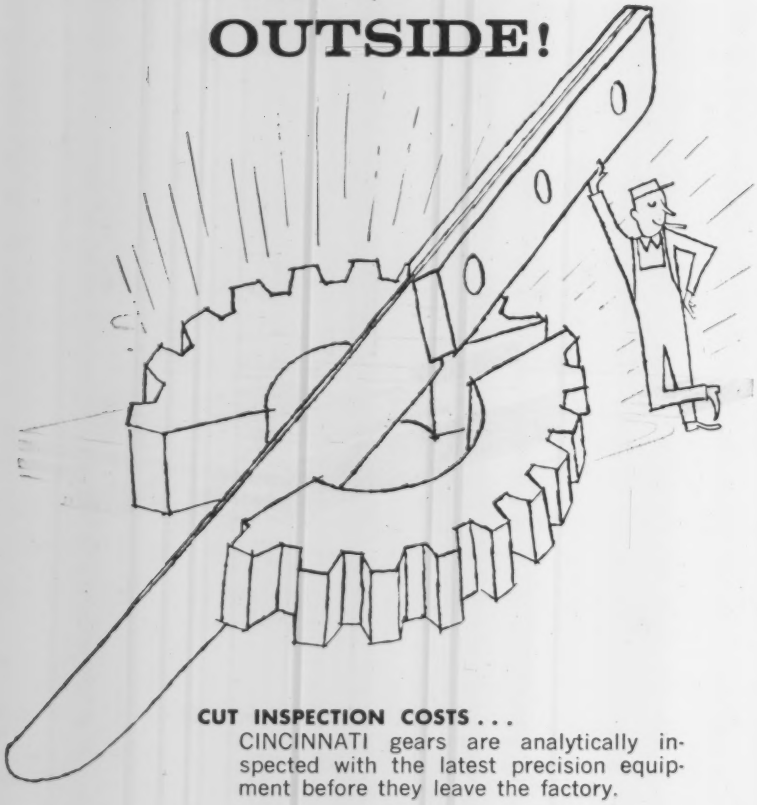
Today, while we're implementing this new service, is the time to go along with us. By acting now, you assure yourself of a steady supply of Carpenter top quality Tool, Stainless and Alloy steels right through the next period of peak demand. Moreover, we can offer this plan to *more* steel users than we've ever served before!

This is our vote of confidence in your future. It's one more example of a forward-thinking program of Carpenter service designed with your needs in mind.

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.

Alloy Tube Division, Union, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.
Webb Wire Division, New Brunswick, N. J.

Cut your "in-plant" gear costs ...from the OUTSIDE!



CUT INSPECTION COSTS . . .
CINCINNATI gears are analytically inspected with the latest precision equipment before they leave the factory.

CUT PRODUCTION DELAYS . . .
CINCINNATI GEAR'S unique production control system assures a prompt delivery schedule maintained as promised.

CUT ASSEMBLY COSTS . . .
CINCINNATI GEAR's consistent quality guarantees minimum assembly time.

CUT CAPITAL EXPENDITURES . . .
CINCINNATI GEAR's higher machine utilization means lower costs for you.

Shaving capacity to 39″
Tooth Grinding to 25″
Involute charts furnished

Write for latest brochure

CINTI® **GEARS,** good gears only

THE CINCINNATI GEAR CO.
Wooster Pike and Mariemont Ave. Cincinnati 27, Ohio
Custom Gear Makers Since 1907

(*Concluded from Page* 116)

uled for completion in 1959.

MacKenzie Muffler Co., Youngstown, will build a 13,500 sq ft addition to its plant. Prime contractor is Joseph Bucheit & Sons Co. Cost is estimated about $75,000.

Shafer Bearing Div., Chain Belt Co., began operations in an 88,000 sq ft addition to its plant in Downers Grove, Ill.

NEW OFFICES

McNay Equipment Co. moved from the Roger Bldg., 1720 Section Rd., Roselawn, Cincinnati, to 9500 Kenwood Rd., Cincinnati.

Vernon Allsteel Press Co. opened a midwest regional sales office. It is at 1355 E. 93rd St., Chicago 19, Ill.

Strom Steel Ball Co. moved its executive offices and plant facilities from Cicero, Ill., to Erwin, Tenn.

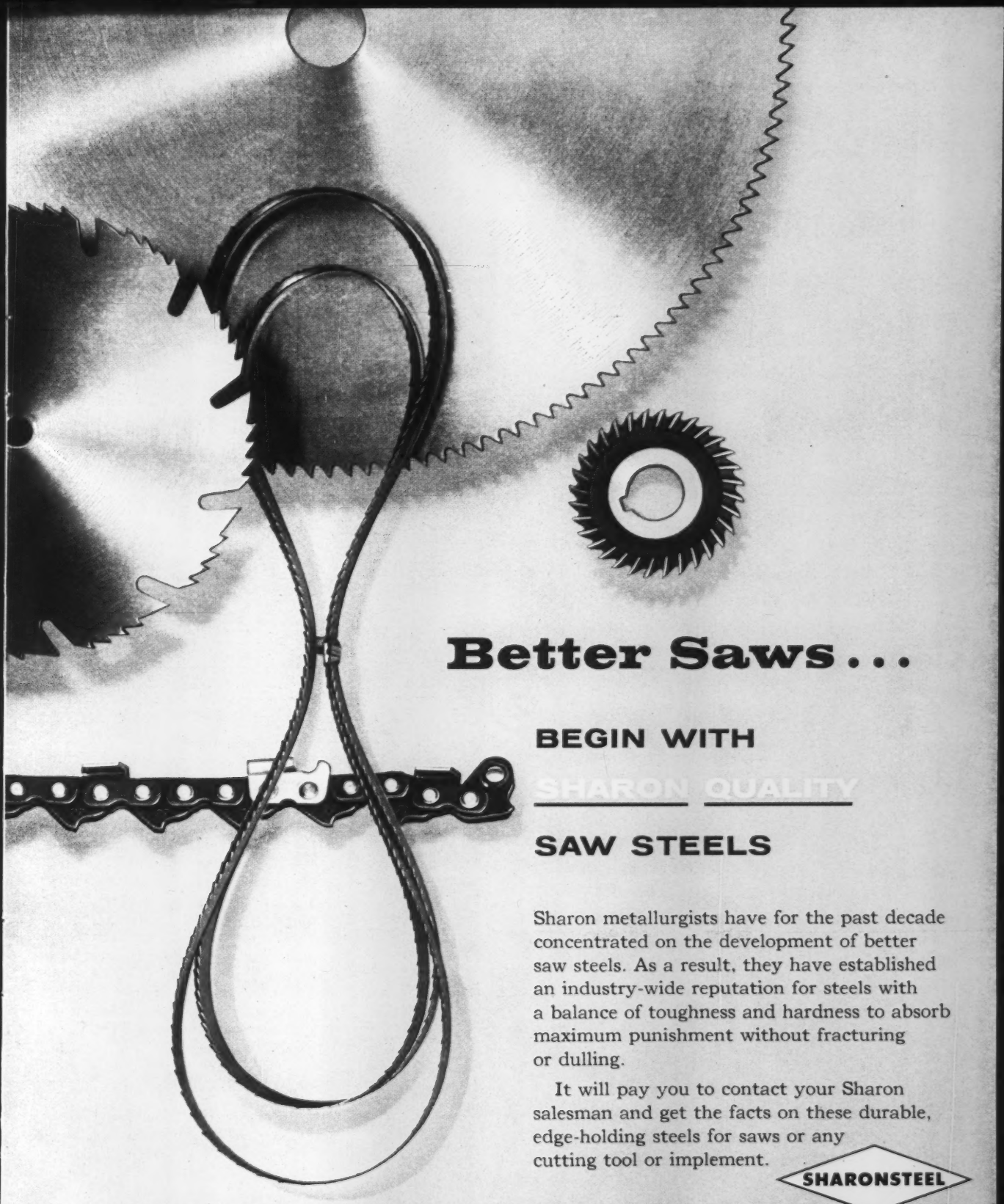
CONSOLIDATIONS

Le Roi Div., Westinghouse Air Brake Co., Milwaukee, sold the assets of its commercial engine business to **Waukesha Motor Co.,** Waukesha, Wis. The move will allow Le Roi to concentrate on its air compressor and tool lines.

F. C. Russell Co., Columbiana, Ohio, will acquire **Vun Russ Co. Inc.,** Hialeah, Fla., manufacturer of aluminum jalousies and awning-type windows. Vun Russ will operate as an independent totally owned subsidiary.

Lincoln Floor Machinery Co., Bowling Green, Ohio, acquired **Wilshire Power Sweeper Co.,** Glendale, Calif. Wilshire makes industrial sweepers.

Yuba Consolidated Industries Inc., San Francisco, purchased **Magna Power Tool Corp.,** Menlo Park, Calif., producer of woodworking tools. Yuba also acquired **Dalmo-**



Better Saws . . .

BEGIN WITH

SHARON QUALITY

SAW STEELS

Sharon metallurgists have for the past decade concentrated on the development of better saw steels. As a result, they have established an industry-wide reputation for steels with a balance of toughness and hardness to absorb maximum punishment without fracturing or dulling.

It will pay you to contact your Sharon salesman and get the facts on these durable, edge-holding steels for saws or any cutting tool or implement.

SHARONSTEEL

SHARON STEEL CORP.

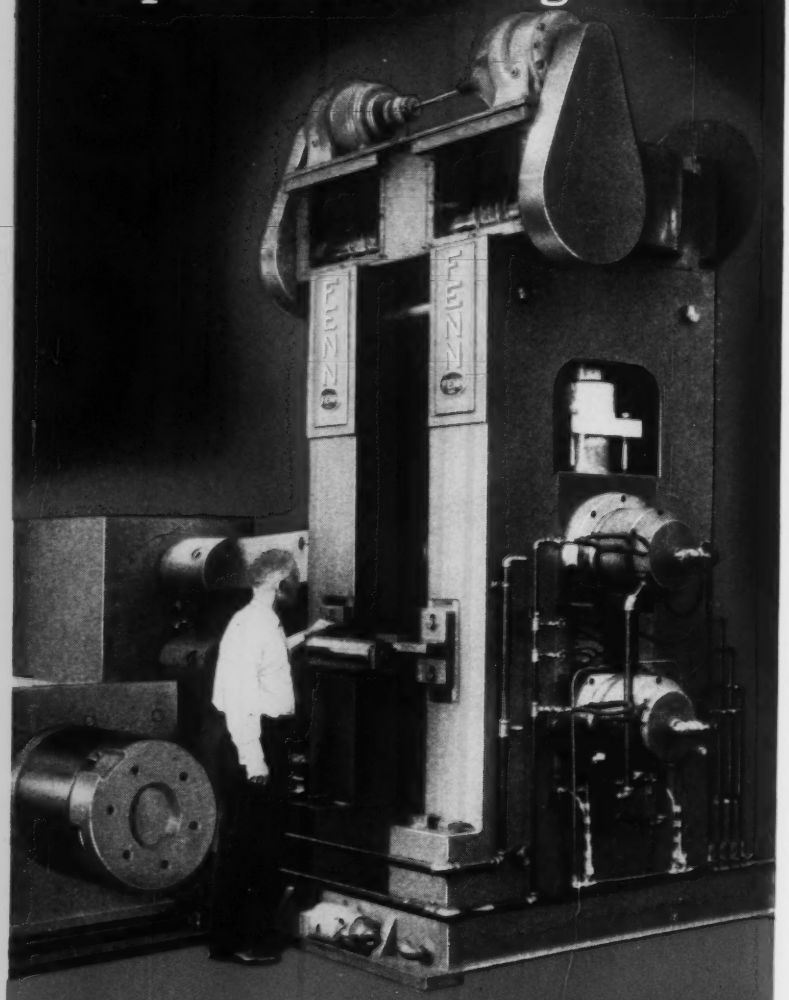
SHARON, PENNSYLVANIA

With the big ones, too

FENN

Sets the Pace

in precision rolling mills



The inherent design of Fenn Rolling Mills achieves greater flexibility . . . extremely high separating forces . . . with dependability that only building to the highest quality standards can provide. Typical is the large heavy duty Fenn Precision Rolling Mill illustrated above. A combination Two-High/Four-High mill, with 16½" diameter rolls, it offers extreme versatility in rolling new alloys with high tensile strengths and is adaptable to either hot or cold rolling.

THE FENN MANUFACTURING COMPANY • 402 FENN ROAD • NEWINGTON, CONNECTICUT

tor Co., Santa Clara, Calif., a subsidiary of Textron Inc.

Sundstrand Machine Tool Co., Rockford, Ill., purchased **Arter Grinding Machine Co.**, Worcester, Mass. Sundstrand acquired Arter's name, inventory, patterns, fixtures, and patents, but not the building or land.

Union Tank Car Co., Chicago, purchased all assets of **Lang Co. Inc.**, Salt Lake City, Utah, for 80,000 shares of Union Tank stock. Lang makes steel fabricated products. Union Tank owns and operates a fleet of railway tank cars.

Hyster Co., Portland, Oreg., acquired **Martin Machine Co.**, Kewanee, Ill. Martin will operate as Martin Trailer Div., a part of Hyster Tractor Equipment Div., Peoria, Ill.

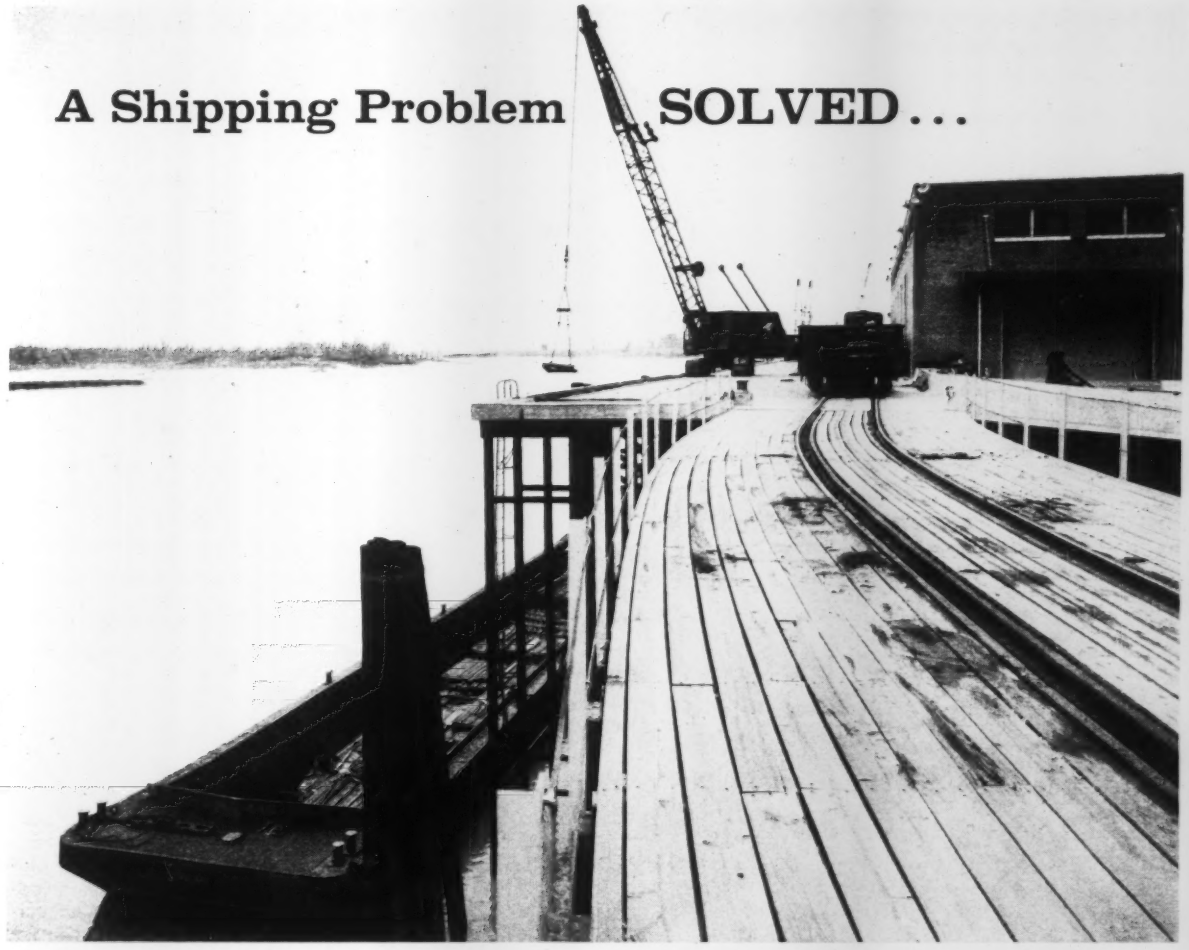
ASSOCIATIONS

Hoist Manufacturers Association Inc. re-elected these officers: President, Arland R. Walkley, general manager, Manning, Maxwell & Moore Inc., Muskegon, Mich.; vice president, Milton L. Aitken, general sales manager, Robbins & Myers Inc., Springfield, Ohio; executive secretary and treasurer, Joe H. Peritz.

National Association of Pipe Nipple Manufacturers Inc. inaugurated a "Seal of Quality" program. Because of complaints that some pipe nipples reaching the market are of inferior quality, association members joining the program will stamp their products as guaranteed to conform to Commercial Standard CS5-46 of the National Bureau of Standards and to be made of new, full weight, mill tested pipe in accordance with ASTM specifications.

American Hot Dip Galvanizers Association, Pittsburgh, elected these officers: President, J. Patrick Hart, National Galvanizing Co., Pittsburgh; first vice president, H. R. Burgess, Line & Cable Accessories Ltd., Toronto, Ont.; second vice president, R. E. Byrd, Atlantic Steel Co., Atlanta. Stuart J. Swensson was re-elected secretary-treasurer.

A Shipping Problem SOLVED...



...at MEMPHIS, Crossroads of materials and markets

If the South, Southeast, Southwest or Mid-West is all or part of your market for metals, metal products or machinery, then you should seriously consider Memphis, Tennessee, in your expansion or re-location plans. Here's why:

MEMPHIS is an inland port and transportation center.

MEMPHIS is the geographic center of a 17-state market.

MEMPHIS offers second morning or better delivery to these 17 states by rail or truck.

MEMPHIS Port is served by five barge lines operating scheduled service to all navigable points on the Mississippi, Missouri, Illinois, Tennessee, Ohio and secondary rivers; and to shipside at the Gulf of Mexico.

MEMPHIS Port facilities are served by 91 motor freight lines reaching all 48 states, Canada and Mexico.

MEMPHIS Port rail facilities connect directly with eight trunk line railroads having 17 radiating lines to provide direct one-line service to 25 states.

MEMPHIS has more than 11,500 acres available in planned industrial districts.

MEMPHIS utility rates are among the lowest in the nation.

MEMPHIS is an excellent labor market, has an advantageous tax structure for industry, has sound, stable government and is a fine place to live.

Join the 39 firms which have located in the 7,800 acre Memphis Harbor and Industrial Area where 7,200 acres are still available including property with and without water frontage.

Memphis—Crossroads of Materials and Markets

Investigate Memphis TODAY

MEMPHIS AND SHELBY COUNTY PORT COMMISSION

MEMPHIS INDUSTRIAL DEVELOPMENT COMMITTEE

Department PC-1, P. O. Box 224, Memphis 1, Tennessee

Please send me "Memphis Industrial Facts" Kit.

Name_____

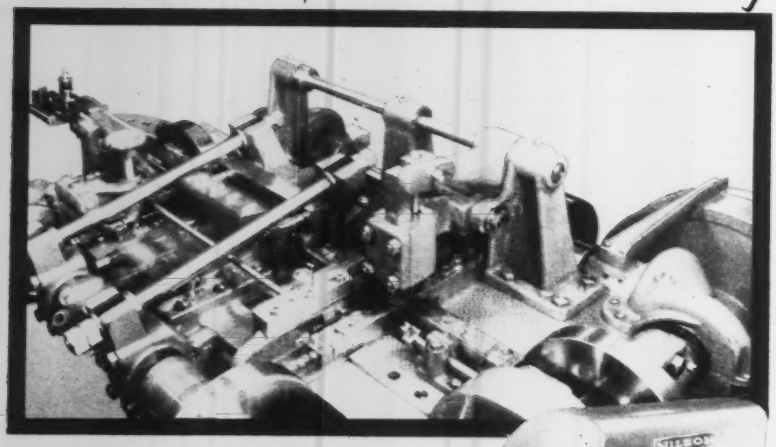
Firm_____

Address_____

City_____ Zone____ State_____

☐ Check here if you want kit sent in plain envelope marked "Personal."

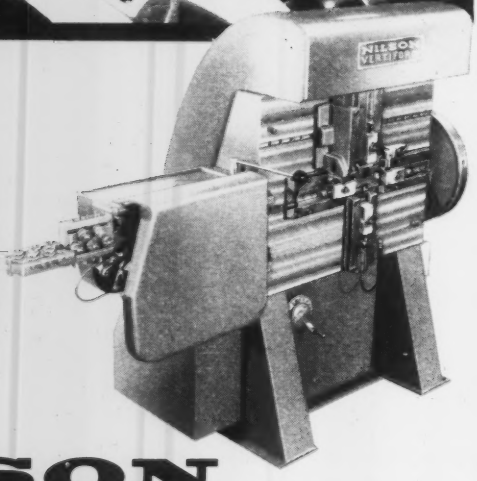
NILSON 4-SLIDES FORMING PRODUCTION PROFITS... *Automatically*



WHY

Cost-Conscious Companies

CHOOSE A NILSON



Every Nilson 4-Slide Forming Machine is designed with built-in flexibility! Most models handle either wire or ribbon metal with equal speed and accuracy . . . can combine stamping, welding and other secondary operations with the basic forming cycle. Easy access to tooling insures rapid setups, minimum down-time for job changeovers.

Whatever your forming application, there's a Nilson 4-Slide to do the work faster, more economically! With 17 horizontal models and the new "Vertiform" machine, Nilson offers you the widest selection of 4-slide equipment.

Investigate the cost-cutting advantages of Nilson 4-Slides in your operations! For a production evaluation of your parts, send prints or samples today.

See these machines in operation at the ASTE Show, Booth 1817

Illustrated at top is Model S-1-F Machine, showing built-in press and open construction of forming area. Directly above is the new Vertiform Machine.

SIZE RANGES:
Wire up to ½" diameter
Ribbon stock to 3½" wide
Feeds up to 32"
5 TO 75 TON
PRESS SECTIONS

NILSON
THE A. H. NILSON MACHINE CO.
1507 Bridgeport Avenue • Shelton, Conn.

AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

Coming May 19

Building a Labor Contract

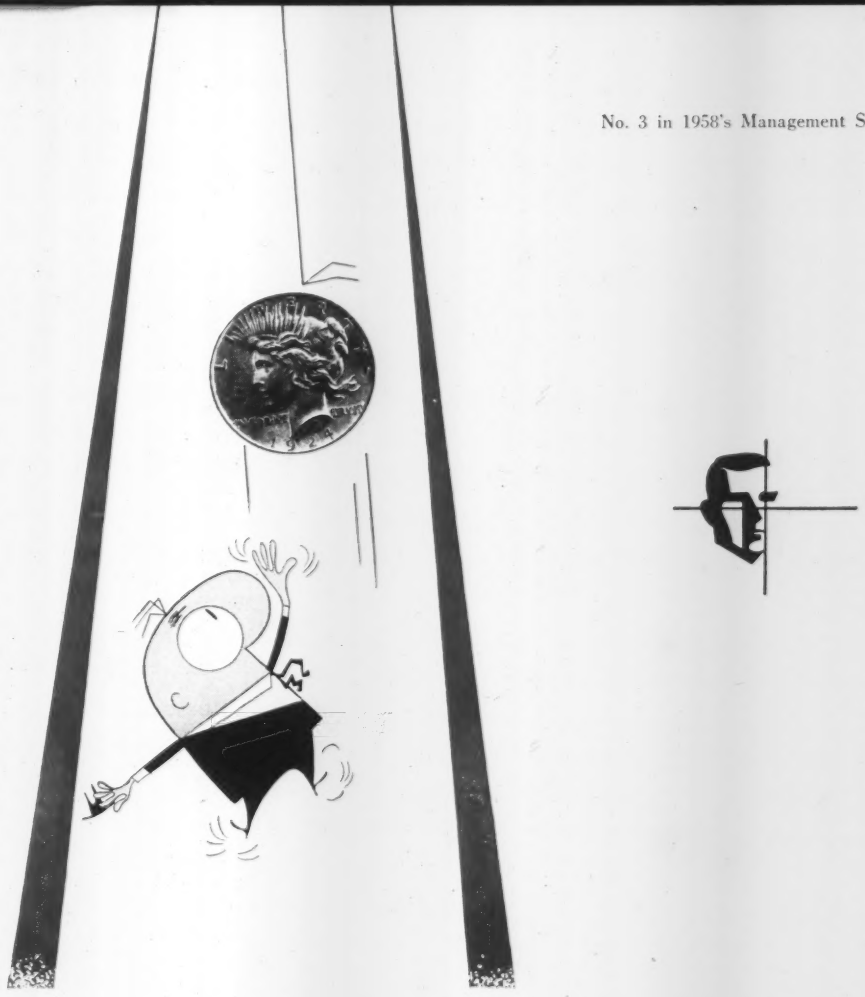
Too often the stress of bargaining for wages and fringe benefits forces negotiators to practically rubber-stamp the noneconomic aspects of the labor agreement. But ambiguous seniority provisions, transfer rights, or work standards can be more costly than higher wages or fringes because they lead to inefficiency or wildcat strikes.

The next article in STEEL's Program for Management will show how the benefits of better liaison between negotiators and the people responsible for a contract's day-to-day workability—the production managers, superintendents, foremen, and similar personnel. Timed for May when the talks are coming to a boil, the article will remind metalworking that a successful contract must work every day of the year on noneconomic as well as economic issues.

Published thus far in STEEL's 1958 Program for Management:

1. **Balancing Management for Profit (Feb. 17, p. 113)**
2. **Production Control for Profits (Mar. 17, p. 83)**
3. **Managing Defensework for Profit (Apr. 14, p. 125)**

Extra personal copies of these Program for Management articles are available until the supply is exhausted. Write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Managing Defensework for Profit

OPPORTUNITIES in missiles for small and medium sized firms are tremendous. Many companies have found their "orbit" in space age defensework. Many more should. The nation's fastest growing industry has plenty of room for the enterprising company that comes up with a product or service tailored to its needs.

Statistical Proof—In the Air Force ballistic missile program (Atlas, Titan, and Thor), firms with less than 500 employees received $267 million of the $1 billion paid to prime contractors up to Jan. 1, 1958. That's almost 21 per cent of the ballistic missile dollar and compares favorably with the 20 per cent of all military prime contract awards to small business in fiscal 1957.

The Army reports the Jupiter has 350 subcontractors; the Redstone has 1675. The Navy, moving away from its traditional role of developing its own weapons, notes that most of its missilework is in industry's hands.

Your Opportunity

The new look in defense takes in a kaleidoscopic mixture of things which are established or under development—glamour metals like beryllium, electronic equipment, manned aircraft capable of speeds beyond the judgment capacity of the pilot, missiles, reconnaisance satellites, and spacecraft.

What's under development today will be tomorrow's production item. Tomorrow is the early 1960s.

This new look, says one Pentagon source, demands the special talents of smaller firms for artisanlike work —work which requires almost impossible tolerances, new machining and forming techniques, and 100 per cent reliability.

The Reward—Opportunities tend to multiply once you're in defensework, but it may take a lot of doing to get your foot in the door.

Example: Five years ago, Sylvania Electric Products Co. turned down research and development contracts from the military. Today, after a change in corporate policy, over 25 per cent of its sales are in the defense category, and its R&D work is turning into production. It's working on 30 missile and advanced radar projects as a specialist in electronics.

The problem of getting started is put this way by B. K. Wickstrum, Sylvania's senior vice president, marketing: "To know what is go-

Defense: A $27-Billion Annual Market

(Estimated spending in millions for fiscal 1959)

AIRCRAFT		**$ 6,904**
Army	104	
Navy	1,830	
Air Force	4,970	
MISSILES		**3,314**
Army	756	
Navy	446	
Air Force	2,112	
SHIPS		**1,296**
COMBAT VEHICLES		**103**
SUPPORT VEHICLES		**169**
ARTILLERY		**13**
WEAPONS		**5**
AMMUNITION		**224**
ELECTRONICS & COMMUNICATIONS		**864**
Army	70	
Navy	160	
Air Force	634	
PRODUCTION EQUIPMENT & FACILITIES		**368**
Army	84	
Navy	50	
Air Force	234	
OTHER PROCUREMENT & PRODUCTION		**494**
MILITARY PUBLIC WORKS		**2,066**
RESERVE COMPONENT CONSTRUCTION		**67**
OPERATION & MAINTENANCE		**9,292**
RESEARCH & DEVELOPMENT		**2,075**
TOTAL		**$27,254**

Source: Defense Department. Figures are based on the President's budget, excluding Mutual Security funds.

Defense Trends Show Up in New Obligational

(Millions)

AIRCRAFT	
Army	
Navy	
Air Force	
MISSILES	
Army	
Navy	
Air Force	
SHIPS	
SUPPORT VEHICLES	
ELECTRONICS & COMMUNICATIONS	
PRODUCTION EQUIPMENT & FACILITIES	
RESEARCH & DEVELOPMENT	

*Money obligated in one year may not be spent for several years after. The above figures represent orders to be placed. All the services have backlogs of funds.
**The Army had money for missiles in 1957-58, but it was hidden in R&D funds. Much R&D money goes for aircraft and missiles.

ing on in electronics, you have to be in defensework, and you must get into R&D to get engineering experience."

To underscore the necessity of being in the stream of developments, he adds: Even if you are losing money on a contract, you are able "to keep tabs on what is going on."

Sylvania makes less money on defensework than it does on commercial sales, but there is an offsetting advantage: Defensework can lead to commercial product development.

Hughes Aircraft Co. used it as a springboard into the semiconductor field. The 100 small firms (half of all first-tier subcontractors) working on AF ballistic missiles see the same sort of future. They include makers of valves, gears, shafts, ducts, tanks, castings, forgings, machinings, plated materials, electrical and electronic components, reports Maj. Gen. Ben Funk, ballistic missile manager, Air Materiel Command.

Guided Missiles, Too—Of the 42 missiles listed in STEEL's "scoreboard" (see Page 130), only ten are of the ballistic variety. Because we are starting production of so many guided missiles, more money (obligated funds) is going to them in fiscal 1959 than in fiscal 1958 (66 per cent of all missile money, vs. 59 per cent, says the Aircraft Industries Association.)

So don't concentrate your efforts on the glamour birds—the ballistic variety. Most small business advisers in Washington think firms new to missiles should look at guided types first.

While second generation ballistic types may cut off first generation contractors, because of radical changes, guided missiles promise to be more orderly in development. The Navy's Talos, for example, is scheduled for a ten-year development program, says Rear Adm. F. S. Withington, former chief, Bureau of Ordnance.

Other Weapons — All defensework is not in missiles. Though the industry will pass the $3 billion mark in sales this year, and will probably double that in three more years, the Pentagon continues to spend a lot of money on such things as aircraft, ships, trucks, tanks, artillery, and communications equipment.

Don't rule out the Navy. Admiral Withington reports it will be 1962 before the service depends on missiles as its fundamental

Availability* and the Makeup of the Forces

Fiscal Years 1957	1958	1959
$6,303	**$5,759**	**$5,866**
0	0	136
1,483	1,536	1,739
4,821	4,223	3,991
2,322	**2,293**	**3,836**
0	0	519**
352	402	613
1,970	1,890	2,704
1,387	**1,781**	**1,335**
77	**39**	**249**
599	**703**	**1,071**
402	**332**	**259**
1,710	**1,761**	**2,256****

	As of June 30 1957	1958	1959
ARMY			
Missile commands	2	4	4
Guided missile battalions	59	65	73
Helicopters	1,901	2,140	2,443
Fixed wing aircraft	2,546	2,797	2,996
NAVY			
Ships (active)	967	901	864
Aircraft (operating)	9,421	8,733	8,054
AIR FORCE			
Aircraft (operating)	20,902	20,330	19,142

Source: Defense Department. Figures are based on the President's budget for fiscal 1959. All 1958 figures include the supplemental funds passed by Congress this year. A supplemental request for about $1.5 billion for fiscal 1959 has been submitted by Defense.

weapon. Also, the submarine program will continue to take a larger share of Navy procurement dollars as long as there are oceans to hide under. At $85 million each, the atom-powered subs which will launch the Polaris amount to a $10 billion market—if we build 100 of them over the next decade. Congressional support for such a program is strong—as it is for more aircraft like the B-52, B-58, and B-70, plus an Army which is based on electronics.

Sales of electronic and communication equipment to the Pentagon will almost double from fiscal 1957 to fiscal 1959. The Electronic Industries Association reports record military sales of $3.9 billion last year.

If you are not in electronics, that trend may dismay you, but one way (besides acquisition or merger) of getting into defense business is to team up with an electronics firm.

The Air Force recently awarded several contracts to teams of small firms. "If one firm or a group has the management ability and the technical knowledge required for the new defense look, it can force the Pentagon to come to it on bended knee," flatly states a Commerce Department official with years of experience in defense sales.

Wanted: New Ideas—"All major contractors are always looking for new ideas," says a General Dynamics Corp. spokesman.

"We not only want your participation; we need it badly," sums up General Funk, speaking to a small business group.

Here's only one example of things to come: Lockheed Aircraft Corp.'s reconnaissance satellite will need a force of 50 contractors.

Summing Up—The Pentagon's comptroller, Wilfred McNeil, believes direct defense spending will rise $1 billion a year above the present $39 billion level for the next four or five years. Space projects alone will soon hit the $1 billion a year rate. (The total to be spent in fiscal 1959 will come to $250 million.) Mr. McNeil's estimates are regarded as conservative by some sources.

If defense spending stays at its present percentage of gross national product, it will climb to $60 billion by 1956, a rate of increase of more than $2 billion a year, says an economist for a leading defense company. The percentage of dollars going to hardware will also hit the uptrend, although increasing dollars for R&D will balance that trend somewhat in terms of direct profit dollars for metalworking.

Will It Last?—No one thinks Russian attitudes will change much. People STEEL talked with agree our defense spending should grow in proportion to GNP—and that's their conservative estimate. They believe that future Russian successes in missiles, satellites, and spacecraft are certain to keep even Congress from going on a money saving spree.

How To Get Your Share

"No generalization is possible," believes C. Lincoln Jewitt, manager of Arthur D. Little Inc.'s Washington office. "Defense business is good or bad, depending on management, R&D facilities, and how well a firm becomes known in the field."

He claims smaller firms may have to scramble for contracts, but many of the cries about a lack of defense business come from folks trying to sell buggy whips.

Alert firms continually contact all possible sources of military busi-

How To Climb on (and Stay on) the Defense

WITH MANAGEMENT:

1. If you have little or no defense business, give one man the responsibility of analyzing defense markets for products you already produce. His background should be in marketing and economics.
2. After his work is underway (maybe you'll have a contract or two by that time), he will need help from a scientist-engineer to develop variations of your products to fit defense needs. The technical man doesn't need a lab, just the opportunity to do a little experimenting in the shop.
3. After you gain experience, add an assistant sales manager for defense products. If you can't afford to set up a Washington office, see that he spends plenty of time there. (Be wary of any offer of "Washington representation" you receive from public relations firms, consultants, and just plain characters: You can easily waste your money.)
4. You'll need some publicity. One man on your public relations staff should concentrate on local coverage, then move rapidly into national coverage, as an important or newsworthy contract comes your way.
5. With a reputation established for good work (even though your contracts may not be too large), put the finishing touches on your bid for continued defense work by establishing a forward planning group of top executives.

WITH FORWARD PLANNING:

1. This is the jumping off place. You can turn back (and lose little) if your people decide an expanded five or ten year defense business program is not within your ability. Up to this time you have been a vender; now you have to ask yourself if you want to assume the responsibilities of subcontracting.
2. You'll probably need a research & development setup. Large sums will be spent in preparing engineering specifications (and you may not get the contract). You'll probably have to tie yourself closely with a prime contractor (and his fate will tend to be yours).
3. If you make the jump, go all out. Join every association that has anything to do with defense work. Get permanent representation in Washington. Live with your primes, so you know what their plans are. Seek the advice of your congressman. Keep looking five to ten years ahead; and keep alternate plans on tap. Changes can be triggered by the whims of Congress, the attitude of the Russians, the politics of the armed services, possible scientific or technical breakthroughs, and your own over-all long range plan for corporate growth.

WITH LABOR:

1. Hang this sign in the office of each of your top executives: "Most money lost on defense contracts is lost by misjudging the cost of labor."
2. Keep your union and workers fully informed of what defense work you are doing and what you want to do (within security limitations). Encourage pride of workmanship on defense projects.
3. Promptly notify your regional Federal Mediation & Conciliation Service representative of your defense work and the first signs of labor trouble.

ness. If they aren't able to sell their regular products, they learn how to modify them to fit.

Mr. Jewett thinks firms must avoid dabbling in defense business. A company must learn the ropes, have management people who understand government contracts, and engineers who know how to work under military procedures.

The risks in defensework are no greater than they are in commercial business, he says: "In neither do you have any assurance of future orders."

The Weapon System — Before missiles hit the headlines, the Pentagon awarded the prime contract for an airframe to one firm. It assembled the aircraft from government furnished equipment which was independently contracted for. The weapon system of contract management which came in with missiles gives the principal contractors much more responsibility.

A contract is awarded for each major subsystem (airframe, guidance, and propellent). Each major subsystem is assembled under the direction of the weapon system manager. Contractors, not the government, furnish equipment for final assembly. The situation has given rise to the controversy about GFE (government furnished equipment) and CFE (contractor furnished equipment).

Small business advocates claim more CFE than GFE is used in new defense products, and that the large contractors tend to subcontract for their contractor furnished equipment with other large firms.

They also contend that standard items which might be government furnished become contractor furnished.

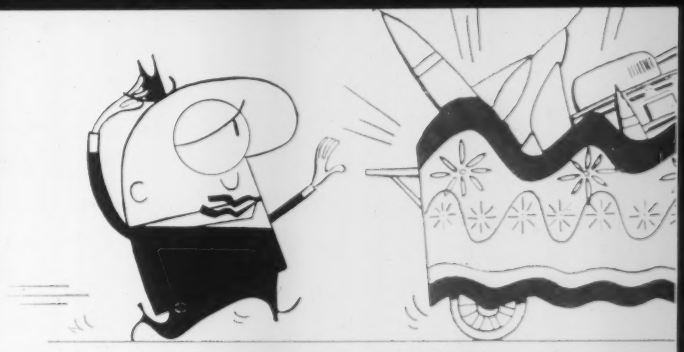
For example, the Matador A had 14 government furnished items in 1954, but the 1957 C version had only ten, amounting to only 20 per cent of the cost of the missile. That left 80 per cent of its value to be parceled out without direct government supervision. Of the portion subcontracted by Martin Co., 58 per cent went to large firms, 36 per cent to small firms, and 6 per cent to 20 machine shops (16 were small), says a 1957 report.

The AF answers that contractor furnished equipment becomes government furnished as a weapon advances to production stages, and that standard items which might have been government furnished can't be because missiles demand that they be redesigned. Standard electronic tubes for aircraft, for example, require different environments in missiles.

The AF promises that the Atlas and B-58 are undergoing the transition from contractor furnished to government furnished equipment. More parts will be available for direct bidding by interested companies.

Obstacles — The Strategic Industries Association surveyed 1000 firms on problems they had in obtaining and processing defense contracts. Topping the list (reported by over 45 per cent of the respondents): "There were too many competitors to justify the effort to bid." Close behind came the charge that "bid preparations cost too much." Third was the complaint that "bidding

Bandwagon



WITH MONEY:

1. When preparing to go after a defense contract, forget about progress payments, efficiency bonuses, and free equipment or facilities. Submit your proposal on the basis of what you have, not what you think you'll get if you obtain the contract. You'll impress the armed forces negotiating officer with your stability—making the right first impression may help you get more contracts later. Avoid asking for additional funds after the contract is underway. Plenty of companies ask for additional funds (and get them), but try to start on the right foot.
2. You want to take a chance and underplay your costs to get your first major contract, but don't forget: The negotiating officer will understand what you are doing and may look for reasons not to give you the contract. Under-cost bidders tend to ask for more money later.

WITH SUPPLIERS:

1. When submitting a proposal, list your potential suppliers or sub-subcontractors. Check them out as carefully as the armed forces check you out. If you misjudge a supplier, the blame will be yours.
2. Keep your suppliers as well informed about your needs and intentions as you want primes to keep you informed of their plans.
3. Never forget that you are tending to establish permanent relationships when you bid on defense business because the armed forces want steady sources of supply.

procedures were too complicated."

The most significant obstacle ranked fourth and was registered by 32 per cent of the respondents: They didn't know what projects they were qualified to work on.

A quarter reported they couldn't get specifications in time to submit bids; 15 per cent said they didn't have enough time to prepare bids.

Some Help—Admittedly, it's not a cinch to break into the defense business. But you can boost your odds by following a course like the one set out in STEEL's simplified program (Page 128). It's based on the knowhow of several industrial and military leaders.

Another Tip: SIA notes that less than half the firms it surveyed received invitations to bid on new contracts as a result of past awards. Mr. Jewett suggests: "Never let your record with the military procurement agencies lie still. Get on every conceivable government bidding list, and supply up to date information about your firm's capabilities."

Advice from Avco—In contrast to general defensework, the missile business is pretty exclusive.

An Avco Mfg. Corp. spokesman thinks "old line production firms with no missile experience" have little chance to break in. "Contracts are awarded on capability."

In his opinion, a new firm formed by people with missile experience has the best chance. Retired executives as consultants are another path, but only a few missile experts will be ready to retire soon.

General Dynamic's Brig. Gen. Kenneth Stiles, vice president, planning, also thinks that most of the slices of the missile pie are spoken for. His firm offers some guidelines for firms trying to crack the defense market.

General Dynamic's central staff of planners formulates a five-year plan of corporate objectives, plus action plans for its divisions. Adaptability to changing conditions is achieved by creating "broad bands" of action possibilities. The chance of a major technological or scientific breakthrough always has to be taken into account.

Subcontractors tend to rely on guesswork too much in assessing the future of defense business, says another planner: "They panic at a headline." Martin Co. is conducting courses to keep its subcontractors up to date.

There are similarities between commercial market research and defense market research, says Martin. A seller must gage the customer's desire for the product, his ability to pay, the state of the competition, and his own costs.

Learn To Question—One of the biggest problems for a defense salesman is learning how to question Pentagon representatives about what's on tap for the future, advises a Martin executive.

Knowing who is the man to see at the Pentagon can also be a problem. As one observer puts it: "About 90 per cent of the things you bring to the Pentagon are applauded, but, the trouble is, you may be talking to the wrong man."

Here's another point to watch: When a proposal is asked for, the firm should question it thoroughly to learn whether it is an interim project or something that has long range possibilities.

A large firm might go into a project because it opened up a new avenue of research, but the smaller firm, the subcontractor, should be careful that the project doesn't dry up.

"A project always looks big when you are at the nuts and bolts end of it," warns Martin.

Setting Your Price

Says a Commerce official: "Hire a cost accountant (it's an allowable expense) before doing business with the Pentagon. Too many firms don't know what their overhead is and tend to give free floor space."

The Pentagon does the same sort of analysis from its own point of

Your Missile Scoreboard: You Can't Count Your

Name & Service	Type & Status	Principal Contractors
Atlas AF	ICBM—Successfully test flown twice over 600-mile ranges; four relatively unsuccessful tests. Operational by late 1959. Launching site construction begins about July 1 at Cheyenne, Wyo.	Convair Div., General Dynamics Corp.; North American Aviation Inc.; General Electric Co.; Burroughs Corp.; American Machine & Foundry Co.
Bomarc AF	Long range interceptor—About 100 are on order. Operational soon; four launching sites are under construction. An advanced version with longer range is under development.	Boeing Airplane Co.; Marquardt Aircraft Co.; Aerojet General Corp.; Westinghouse Electric Corp.
Bullpup N	Air to surface—Under development.	Martin Co.; Aerojet General
Bull Goose AF	Fiberglas surface to surface decoy (with radar countermeasures). Under development.	Fairchild Engine & Aircraft Co.
Corporal A	Long range artillery—Operational.	Firestone Tire & Rubber Co.; Gilfillan Bros. Inc.; Ryan Aeronautical Inc.; Cary Multiplier Co.
Corvus N	Air to surface (to be carried by aircraft carrier based bombers). Under development.	Temco Aircraft Corp.
Crossbow AF	Air to surface under development.	Northrop Aircraft Inc.
Dart A	Antitank—Operational.	Grand Central Rocket Co.; Utica-Bend Corp.; Aerophysics Development Corp.
Duck AF	Surface to surface—Under development.	Fairchild Engine.
Falcon AF	Air to air—Two versions (one guided by radar, the other by infrared radiation) are operational. Two other versions went into production recently.	Hughes Aircraft Co.; Thiokol Chemical Corp.
Genie AF	Air to air—Successfully test fired.	Douglas.
Green Quail AF	Fiberglas air to surface decoy (with radar countermeasures). Under development.	McDonnell Aircraft Corp.
Hawk A and Marines	Mobile, low altitude antiaircraft—In production; launch sites have been selected.	Raytheon Mfg. Co.; Northrop; Thiokol.
Honest John A	Short range artillery—Operational.	Douglas; Hercules Powder Co.
Hound Dog AF	Air to surface (to be carried by B-52s). Under development. (B-58s will carry a pod to be used as an air to surface missile or a freefall bomb.)	North American.
Jupiter A (To be operated by AF.)	Mobile IRBM—Three successful test firings; four partly successful. A squadron of 15 may be deployed in Britain at end of year.	Chrysler Corp.; North American; Ford Instrument Div., Sperry Rand Corp.; Goodyear Aircraft Corp.
Lacrosse A	Tactical artillery—Operational.	Martin; Thiokol.
Little John A	Mobile, short range artillery—Operational.	Emerson Electric Co.
Matador AF	Medium range surface to surface—Operational. Well over 1000 have been built. Improved version is in production.	Martin; Thiokol; Allison Div., General Motors Corp.; Goodyear Aircraft; Fairchild Camera & Instrument Corp.
Minuteman AF	Solid fueled ICBM—Under development. Possible operational date: 1962.	
Nike-Ajax A	Antiaircraft — Operational. About 245 installations have been built.	Western Electric Co. Inc.; Douglas; Aerojet.
Nike-Hercules A	To replace the Nike-Ajax—In production; to be operational in June in four areas. (Missile Master is a semiautomatic system for co-ordinating the fire of antiaircraft missiles, including the Ajax, Hercules, and Hawk. Martin, Airborne Instruments Laboratory, and AM&F are principal contractors. It is operational in the Washington-Baltimore area.)	Western Electric; Douglas; Thiokol.
Nike-Zeus A	Antimissile missile—Under development; perhaps operational by 1963. (Plato is a mobile antimissile missile system designed to fire the Zeus. It's under development. Sylvania Electric Products Inc., GE, AM&F, and Sanders Associates are principal contractors. Wizard is an AF missile detection system under development. Radio Corp. of America is principal contractor.)	Western Electric; Douglas; Grand Central.

Sources: Defense Department and STEEL.

view, reports J. S. Tassin, deputy director, contracts division, Navy Bureau of Aeronautics. When his bureau asks for a proposal, it wants to know:

1. Does the firm have the technical qualities for the job? 2. Does it have the plant and facilities? 3. Does it have the manpower? 4. Can it finance the job, or will it need government help? 5. Can it meet the delivery time?

Lastly, the bureau wants to know at what price the firm can do the job, not what price it has to bid to get it, emphasizes Mr. Tassin.

The bureau has had some bad experiences with "eager beavers" that bid half what an experienced firm would, then came back for more money. Direct labor costs, says Mr. Tassin, are the area most firms tend to underestimate.

The Navy also checks subcontractors listed by the prime seeking a contract, and "we could do more of it," adds A. A. Clagett, procurement planning head for the Bureau of Aeronautics. How rough that check can be is indicated by North American Aviation Inc.'s experience on an AF contract. The company received 200 brochures from potential subcontractors for a fuselage section. After visiting 21 of the firms, it recommended that only three be allowed to bid.

Time Is Money—When setting your price, you must figure the time you'll spend in doing government business. Here is the usual pattern of processing a contract:

1. Contractors submit general proposals. 2. They are evaluated by the Pentagon, and R&D contracts are awarded to the most promising. 3. The selected contractors refine their proposals, perhaps build a prototype. 4. Again the Pentagon evaluates the proposals. 5. The best is picked for final

Defense Profits Until You Know Your 'Birds'

Name & Service	Type & Status	Principal Contractors
Pershing A	Long range artillery (solid fueled successor to the Redstone). Under development.	
Petrel N	Air to surface (a torpedo). Operational; production completed.	Fairchild Engine.
Polaris N	Solid fueled IRBM (to be launched by submerged submarines). Operational by 1960. Components have been successfully test fired. A full test is scheduled late in 1959. A land based version could be adopted by the AF, succeeding Jupiter and Thor.	Lockheed Aircraft Corp.; Aerojet; GE; Westinghouse; Interstate Electronics Corp.
Rascal AF	Air to surface (for B-47s). Operational.	Bell Aircraft Corp.; Federal Telephone & Radio Co., division of International Telephone & Telegraph Corp.
Redstone A	Long range artillery—Operational. An advanced version is under development.	Chrysler; North American; Ford Instrument; Reynolds Metals Co.
Regulus I N	Surface to surface—Operational.	Chance Vought Aircraft Co.; Allison.
Regulus II N	To replace Regulus I—Operational early in 1959. The first of seven subs to carry two missiles each was commissioned last month.	Chance Vought; GE; AC Spark Plug Div., GM.
Sergeant A	To replace Corporal in the '60s.	Sperry Gyroscope; Thiokol.
Sidewinder N and AF	Air to air—Operational.	Philco Corp.; GE; Eastman Kodak Co.
Snark AF	Surface to surface (a subsonic intercontinental missile). Operational; over 100 have been built. An advanced version is under development. One launching site is under construction. Production rate: Two missiles a month.	Northrop; Aerojet; Pratt & Whitney Aircraft, division of United Aircraft Corp.; Allison.
Sparrow I N	Air to air—Operational; production nearly complete.	Sperry Gyroscope; Douglas; Aerojet.
Sparrow III N	To replace Sparrow I; in production.	Raytheon; Aerojet.
Talos N	Antiaircraft — Operational. Navy has ten-year development plan for it.	Bendix Aviation Corp.; McDonnell; Sperry Gyroscope; GE.
Talos L A	Land based version of Talos; being evaluated by the Army as an interim antimissile missile. Decision on replacing the Nike—Ajax and Hercules with Talos will come this year.	Bendix; McDonnell; RCA; IT&T.
Tartar N	Antiaircraft—Contracts awarded for eight launching destroyers.	Convair; Hercules Powder; Bendix; Philco.
Terrier N	Antiaircraft—Operational. An advanced version will arm an aircraft carrier in 1959.	Convair; Sperry Gyroscope.
Thor AF	Mobile IRBM—Sixty may be deployed in Britain by end of year. One has been test fired with its nose cone attached. Production is probably six a month. A solid fueled version may be under development.	Douglas; North American; AC Spark Plug Div., GM; GE.
Titan AF	ICBM—Several have been built. Operational by 1960. Captive tests are underway. A new liquid propellent for it is under development.	Martin; Aerojet; Reaction Motors Inc.; Avco Mfg. Corp.; Remington Rand Div., Sperry Rand Corp.; Arma Div., American Bosch Arma Corp.; Western Electric.
Unnamed AF	Small, lightweight IRBM (to be fired by B-70s at extreme altitudes)—under development.	

development and production.

The Rat Race—Depending upon the vagaries of the armed forces and the whims of Congress, the program is canceled, cut back, stretched out, completed and canceled, completed and renewed, or a revised version is suggested, and the process begins all over again.

That's only part of the Pentagon puzzle. Don't forget such things as mountains of paperwork (for the subcontractor and the prime), special conferences with other contractors, and the need for special defense rated orders from suppliers of materials.

You have to be a real horse trader, suggests Mr. Jewett.

There is as much give and take to settling a defense contract as there is in setting up the price on a construction job, advises Martin.

"We are straining toward impossible perfection," adds Admiral Withington, "but a modest change in specifications on an antisubmarine device recently saved $100,000."

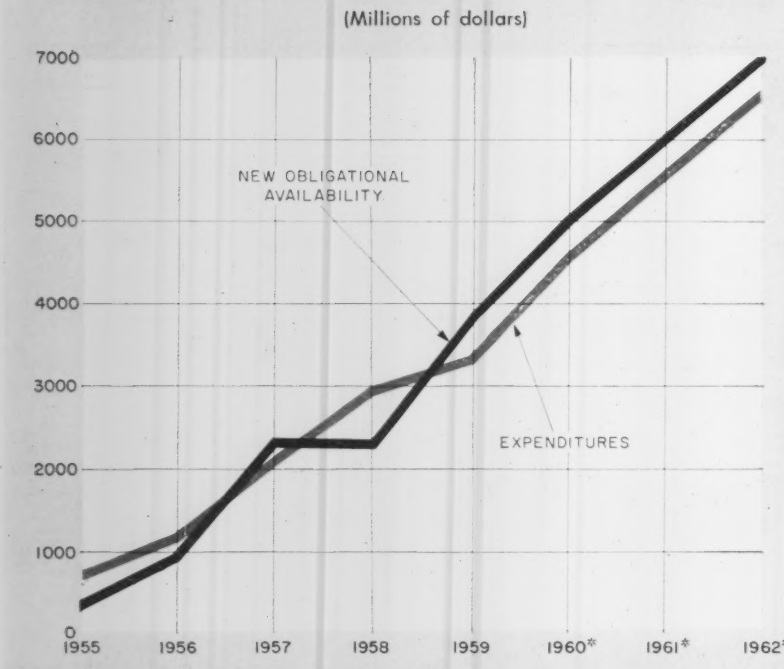
Another Problem—The Pentagon is in the middle of a cost cutting campaign. Advises Lt. Gen. C. S. Irvine, AF deputy chief of staff for materiel:

"Industry must: 1. Accelerate internal administrative procedures. 2. Adapt quickly to new requirements. 3. Accurately forecast and control expenditures. 4. Exchange scientific and engineering information among members. 5. Advance its production techniques to keep pace with design advance."

Testing and inspection are expensive, but General Irvine wants more of it. Missile parts, components, subsystems, and, finally, the whole bird are tested.

Reynolds Metals Co. has one inspector for every four production people who fabricate Redstones at

The Future of the Missile Industry Seems Certain



What Do Missiles Cost?

(Excluding warheads)

Atlas	$2 million
Matador	$60 thousand
Regulus II	$500 thousand
Snark	$600 thousand
Thor	$1 million

How Are the Dollars Divided for an Air-to-Air Type?

Nonnuclear warhead	3.5%
Mechanisms	33.0%
Electronics	43.0%
Electric power source	1.5%
Airframe	12.5%
Solid propellent rocket engine	6.5%

Sources: Various industry sources for dollar figures; Aircraft Industries Association for percentages. All figures are "production run" estimates, excluding research, development, and test costs.

Source: Defense Department.
*Estimated by STEEL.

Huntsville, Ala. In comparing its needs for technical graduates per sales dollar, General Electric Co. says it employs four times more for defensework than it does for commercial activities.

By making your price high enough to cover all costs of a military contract, you insure yourself a reasonable profit, says the Pentagon. But you won't get away with too much. To give you an idea, a course for contract negotiators is described this way:

"The Navy price analysis course examines current methods used in cost, price, and profit analysis. It analyzes the major elements of cost and the use of recently developed statistical cost techniques. Particular emphasis is placed on direct labor, material, and subcontract costs, Among the techniques considered are the use of formulas for pricing spare parts, the use of labor, material, and production indexes, and the use of learning curves to estimate future labor requirements."

Renegotiation—The last hurdle is the renegotiation of contracts. SIA reports that over half of the 1000 firms it surveyed have gone through the process. Almost all refunded part of their profits. AIA has started a campaign to allow the retention of profits achieved through greater efficiency, but the outlook for any change in the law is dim.

Profits—After the accounting dust settles, airframe manufacturers make about 2 per cent on sales, says AIA. Electronic firms do a little better. Profits figured on individual contracts, says the Navy's Bureau of Aeronautics, run to 7 to 8 per cent on R&D work (cost-plus-fixed-fee contracts), up to 10 per cent on production runs (fixed price contracts). Sylvania makes better than 5 per cent on its military sales; Hughes gets about 3 per cent. Minneapolis-Honeywell Regulator Co., Grumman Aircraft Engineering Corp., and Reaction Motors Inc. note that their R&D work held 1957 profits down.

The military's biggest contractor, General Dynamics, earns about 3 per cent on sales.

Outlook—With the shift to missiles and other new defense weapon systems, we'll never again make thousands of an item over a five-year period. But don't be misled by the lack of quantity. With production contracts on a fixed price basis, says Hughes, you tend to make as much money per item—whether it's produced in the hundreds or thousands. Under the weapon system of contract management, primes and subcontractors tend to get their capital equipment in shape during the R&D stage: The Thor was ready for "mass" production as soon as final development tests were made.

Your Prospects — Don't forget: There are a lot of ways to get into defensework. You can find your "orbit" even though you are not a producer of exotic missiles or space stations. The bread-and-butter items are needed just as badly.

This is a foreman dressing for work!

Time was when Pete wore the grubbiest work clothes he could find. He *had* to—with all the trouble-shooting he did. And as production fell behind he sometimes even had to fill in on a machine. What a waste of a good foreman!

Today, you'll find Pete in a white shirt—and tie. No longer does he do other men's work. Now he's the real right hand his management needs and wants.

The Keysort system for industrial control made the difference. Keysort now helps Pete and his management plan *in advance*, reports performance at every stage. Man-hours are used more profitably . . . and experienced foremen like Pete are free to concentrate on supervision, work assignments, production flow. Without extra bookkeeping, without having to pitch in themselves.

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FAMILY man with 30 years industry wide experience. Qualified in open hearth, electric furnace and foundry practice. Remuneration expected in keeping with performance, good work record. References furnished upon request.

MANY employers regard me as

We hope this ad will emphasize a condition currently existing in our industry.

Due to current economic conditions abroad, imported manganese alloys are readily available. Significant quantities are being imported and sold at prices substantially below our domestic cost of production. This impairs our ability to maintain the facilities required to insure a continuing domestic supply of these essential alloys.

Because we believe that this problem may be of special interest to you, we invite your comments.

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Technical Outlook

CAST FORGING OR FORGED CASTING?—Thompson Products' Jet Div., Cleveland, makes parts with cast cores and forged edges. The method is said to eliminate finish machining. The cast structure acts as a backbone for high stress-rupture strength; the forged portion contributes good thermal fatigue and yield strength. The idea works best for strong, thin parts, says Thompson.

MAGNETIC SEPARATORS NEEDED—In a few years, 100 million tons annually of taconite iron ores will be processed by magnetic separation, predicts Lawrence A. Roe of International Minerals & Chemical Corp., Chicago. Magnetic separators also have big potential elsewhere: Beneficiation of nepheline syenite as a bauxite substitute in aluminum production is an outstanding possibility. Mr. Roe sees a gradual shift from wet to dry magnetic separation methods.

WARM ROLLING—European mills are using controlled low temperature hot rolling to increase notch toughness in ship plates. For the final finishing pass, the steel may be as cool as 1360° F. European mills have a wide choice of practice because this type steel is ordered on the basis of impact properties; in this country, composition and practice for ship plates are defined by specifications within narrow limits.

IMPROVED PAINT PIGMENT—It's made by fusing lead chromate on a silica core and combines rust inhibiting properties of lead and chromium compounds with chalking-resistant lead chromate, says National Lead Co., New York. The pigment is compatible with practically all paint vehicles. Called M50, it permits a combination of rust inhibition, weather resistance, and color in a single coating medium.

NEW LIFE FOR SAP—Sintered Aluminum Powder, lazing along without commercial applications, may be spurred by studies at Rensselaer Polytechnic Institute. Researchers there have demonstrated that it isn't the amount of aluminum oxide in SAP that gives it strength, but the dispersion of the oxide. Their goal: High strength at elevated temperatures through control of oxide dispersion.

FORGING LUBRICANTS—When forging aluminum, you'll get good die filling if you follow these steps, a Battelle Memorial Institute report suggests: 1. Etch the billet with sodium hydroxide, then dip in an aqueous colloidal graphite solution before heating it for forging. 2. Forge with an oil base lubricant having high viscosity and a high flash point.

THE MONKEY HOLE—That's what they call an abandoned stone quarry in Derbyshire, England, serving as a test pit for steel structures such as high tension line towers. The quarry walls protect the structure under test against chance wind loads and provide solid anchorage for cables to stress the structure from all sides.

SMOG SENTINEL—A continuous method for analysis of sulfur dioxide and nitric oxide in flue gases (major smog irritants) has been developed in California. It uses a Beckman Infrared Analyzer in combination with a vapor condenser and electrostatic precipitator to give instantaneous readings.

BETTER ALUMINUM WELD—Researchers at the British Welding Research Association are joining 1 in. aluminum in two passes with an arcwelding head that features an unusually large argon shield. The device has an inner and outer gas input that permits much higher electric currents without danger of puckering or tunneling the weld metal. Edges are prepared with a 30-degree V (included angle).

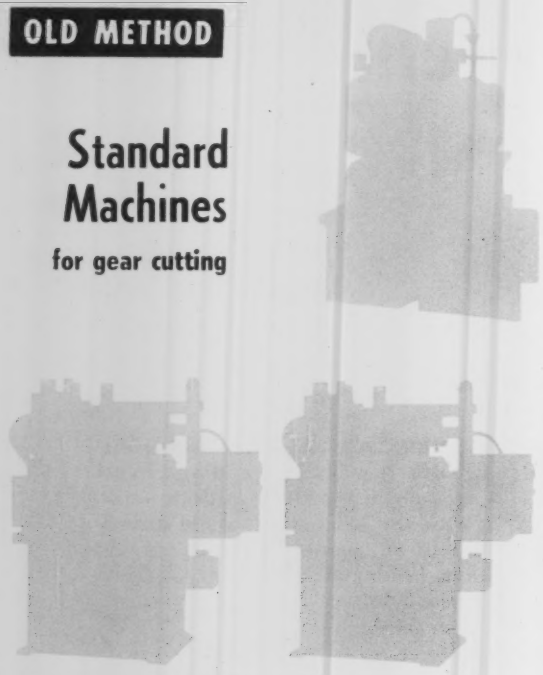
ECONOMY IN BOILERS—Babcock & Wilcox Co., New York, reports it has boilers capable of generating steam efficiently by burning a new type low-volatile "char." Company spokesmen term the equipment a "major breakthrough" in the search for ways to reduce fuel costs for power production.

Metalworking Outlook—Page 79 Market Outlook—Page 189

OLD METHOD

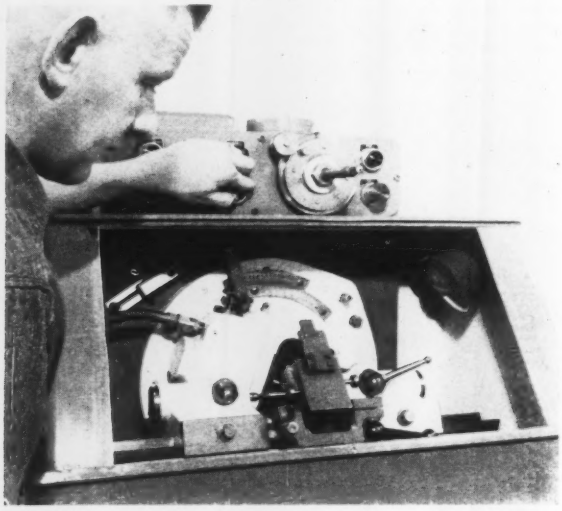
Standard Machines

for gear cutting



NEW METHOD

Special Machines for fine pitched gears



GAINS:

Over-all costs cut 50 per cent.
Production boosted 200 per cent.
Expansion of product line.
Improved quality.

RESULT:

Annual increase in orders worth $25,000 that used to go to competitors.

Special

Fine-pitch gears were formerly made on standard equipment. New machines have boosted quality and production, have trimmed costs an average of 50 per cent

IT USED to cost Alling-Lander Co., Sodus, N. Y., $16.85 to turn out 100 fine-pitch gears with standard equipment. It's now making the same number on special machines for $5.95—a cost reduction of 65 per cent.

The company has benefited many ways, says Fred A. Smyth, vice president. For instance, Mr. Smyth says his company formerly got only about 10 per cent of the jobs on which it submitted bids.

Price was the biggest barrier. The lowering of costs made price reductions possible, putting the company in a better competitive position. (Example: The price of one pinion gear was cut from $12.60 to $6.60 per hundred.) It now gets orders on 40 to 50 per cent of its bids. The net result is an additional $25,000 a year in contracts.

Other Gains — Over-all production is about 200 per cent higher than it was. Example: The rate for an instrument gear has been boosted from 55 to 120 completed parts an hour.

The new equipment will hold tighter tolerances; there's less trouble with rejects and rework; surface finish of gears is better; and it's now possible to produce gears that couldn't be made on the old equipment.

Product Line — Alling-Lander makes custom gears, many with fine pitch. Roughly, their diametral pitch runs from 32 to 180. Pitch diameters range from 1/4 to 3 in. The new No. 3 Fellows gear shaper handles this range. Tolerances on the fine-pitch gears now can be held to 0.0005 in.

Machines Cut Gear Costs

In some cases, it's necessary to shave the gears for final size and finish. A new No. 4 Fellows shaver fills this need.

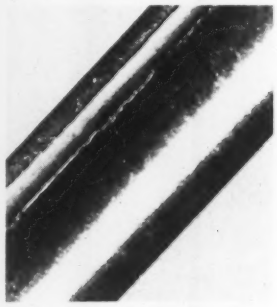
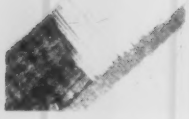
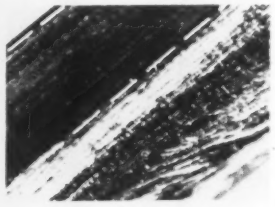
Selling Management—Mr. Smyth says the re-equipment idea started in Alling-Lander's production department. It took form when the production men investigated what special machines could do and talked with other gearmakers about their experience.

As soon as they were convinced, a complete cost analysis was ordered.

It sold management on the desirability of adding special equipment to handle the problem of competing in the fine-pitch gear market.

COST CRISIS COMPETITION

This article is part of a campaign to help industry achieve lower unit production costs. The accompanying example and others to follow are samples of what the editors of STEEL are looking for in their nationwide search for companies that have brought about important cost savings through more efficient use of capital equipment. Does your company qualify? If so, enter the Cost Crisis Competition. Write to the Cost Crisis Editor, STEEL, Penton Bldg., Cleveland 13, Ohio, for your awards kit.

SUPERSPEED CUTS	CUTTING TOOL	WORKPIECE	CUT DEPTH
30,000 sfpm	CARBIDE 0° RAKE	4340 STEEL, 54 Rc	 0.005 in.
120,000 sfpm	HIGH SPEED STEEL 3°-POSITIVE RAKE	4340 STEEL, 32 Rc	0.005 in.
162,000 sfpm	 BROADNOSED-HIGH SPEED 15°-NEGATIVE RAKE	4340 STEEL, 45 Rc	 0.005 in.

attacking the PRODUCIBILITY BARRIER

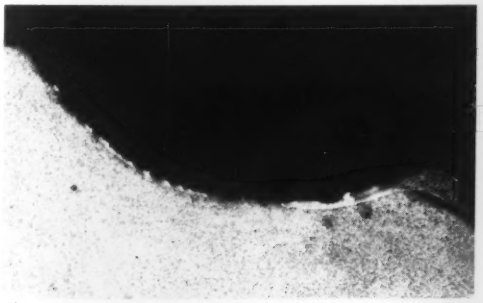
Are These Tomorrow's Machining Speeds?

THE DAY will come when you will have to make parts from materials that can't be machined and formed economically by traditional methods.

Two routes of attack are open: Design to reduce the role of machining, or find new ways to machine.

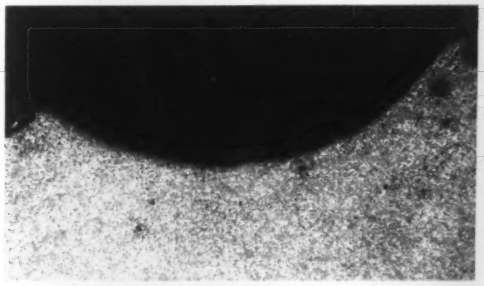
Some companies working with high strength, high temperature metals, notably aircraft and missilemakers, already face the problem. Lockheed Aircraft Corp., Burbank, Calif., is trying the second

RESULTS



200X

CUT WAS RAGGED, TOOL WORN AND CHIPPED



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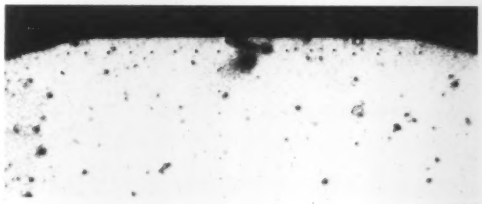
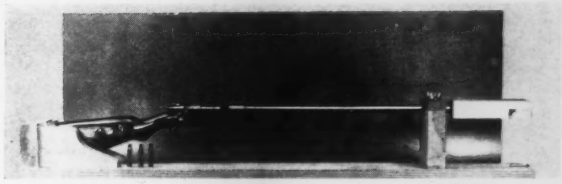
GOOD CUT, TOOL PUSHED BACK



50X

GOOD CLEAN CUT, ONLY SLIGHT TOOL WEAR



How It's Done

This modified 30-06 rifle (at top) drives a machined projectile, 0.2985 in. in diameter and 2 in. long, past a cutting tool. The tool is positioned in a holder that screws onto the end of the rifle barrel. The inset shows a half section of the toolholder with a sample projectile in the groove. Note the threads for mounting on the barrel, the hole behind the projectile to vent gases, and a taper slot in front of the tool for chip clearance (no problem so far, since the chips apparently vaporize).
Robert L. Vaughn, the engineer now running the tests, shows where the cut part emerges from the toolholder. It is then caught in either a series of cardboard boxes stuffed with cotton waste or a plastic chamber filled with silicone fluids and gums

Lockheed Aircraft is shooting workpieces out of a rifle. They graze cutting tools at speeds as high as 162,000 surface feet per minute. Results show promise

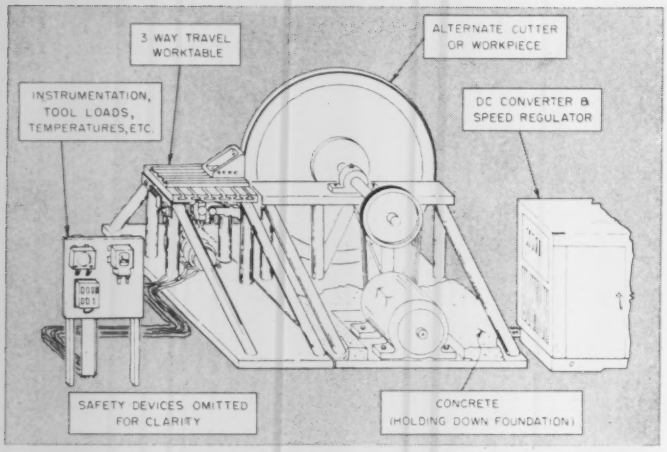
approach. In its investigation of the speed barrier, it is firing workpieces from a rifle. Aimed at a cutting tools, they attain speeds up to 162,000 sfpm.

Rationale—The underlying question is posed by Alfred H. Petersen, group engineer, producibility methods section, Lockheed: We can machine aluminum at speeds as high as 15,000 sfpm. Must we drop to speeds as low as 65 sfpm for the future production of similar high strength steel or titanium components?

Here's why speed may hold an answer. At relatively low machining speeds, the material ahead of the tool is deformed by compression, and the chip is crushed. Both problems become smaller as speed is increased. At the critical velocity, the material doesn't have enough time for deformation. It fails in shear.

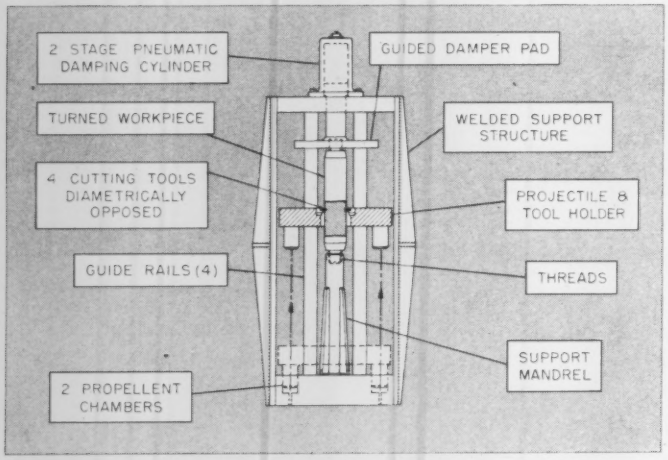
Research at speeds above those used in practice indicates a so-called "valley of death," where tool temperatures and required horsepower are abnormally high.

At still higher speeds, beyond the valley, tool temperature (a major factor in tool life) and horsepower requirements tend to drop. It may be economically impossible to machine superalloys at, say, 300, 600,


3 WAY TRAVEL WORKTABLE
ALTERNATE CUTTER OR WORKPIECE
INSTRUMENTATION, TOOL LOADS, TEMPERATURES, ETC.
DC CONVERTER & SPEED REGULATOR
SAFETY DEVICES OMITTED FOR CLARITY
CONCRETE (HOLDING DOWN FOUNDATION)

What's Ahead

Eventually, a more practical test of machining at these velocities will be found. The two theoretical devices shown here were included in a special report Lockheed engineers made to the Air Materiel Command. One, at top, utilizes the high speed of a large disc, which may be either the cutter or the workpiece. The other would fire a toolholder upward, past the workpiece (stationary or rotating), to be caught by the damping system



or 800 sfpm, but it may be practical to cut them in the 100,000 to 150,000 sfpm range.

Proof—Lockheed admits it may be on the threshold of a major breakthrough in machining know-how, or it may be going up a blind alley, but so far, the evidence looks good.

Here are conclusions based on Lockheed's preliminary tests:

- Machined cuts can be made on heat treated 4340 steel (52 Rc) at speeds of 162,000 sfpm.
- High speed steel tools seem to hold up better than carbides.
- Final condition of the HSS tools is about the same regardless of machining velocity (in the 30,000 to 162,000 sfpm range).
- As velocity goes up, the cut becomes smoother, with less deformation.
- Hardness of the workpiece has little effect on the cutting action or the final tool condition.
- No workpiece deformation occurs with broad nosed tools.
- Surface finish of a flat machined surface averages 20 microinches.
- Hardness increases 1 to 4 points Rc to a depth of 0.002 to 0.010 in. below the machined surface.

Where Now — Lockheed's tests have been conducted with a rifle and projectile, hardly a practical production approach. The object has been to prove or disprove the feasibility of detaching metal at unheard of rates.

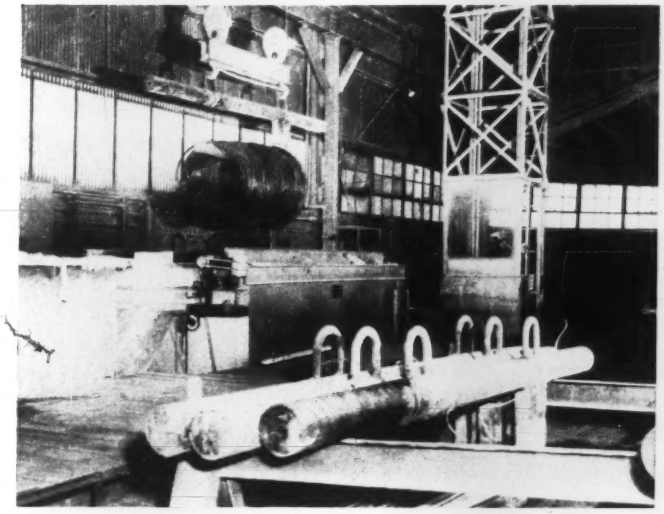
The project has been financed solely by Lockheed. About a month ago, a contract was awarded to the company by the Air Materiel Command. Covering 18 months of study, it represents Phase No. 1 of a six-phase program that is figured to take six years to complete. If the first phase pays off, a number of things will be investigated in later studies, such as the development of methods, production equipment, and application procedures.

Lockheed's engineers have started a design for a larger, more versatile test apparatus that will handle bigger workpieces and speeds up to 360,000 sfpm.

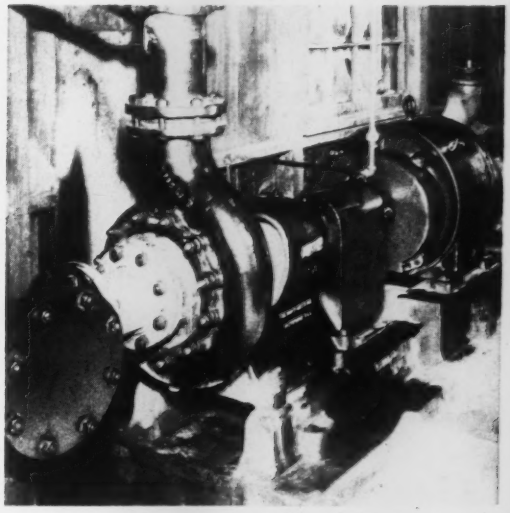
Road Ahead—What kind of machine will be needed to produce parts at these speeds? What about such things as tools, tool geometry, cutting fluids, and feeds?

Even the Lockheed engineers aren't willing to speculate, but within a few years the whole concept of the upper limit of machining speeds will be explored territory; fact will be separated from the fiction.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*



Pickling of stainless wire in a midwestern wire mill. Wire coils are supported by a stainless alloy hook. Three smaller hooks are shown in foreground



To recirculate spent pickling acids and milk of lime in neutralizing tanks, Type CN-7M alloy pumps and valves are used

Cast Stainless Stands Up to Pickle Liquor

PICKLING of specialty mill products, such as stainless steel wire and strip, presents a difficult equipment problem because of the extremely corrosive nature of the pickling and cleaning solutions.

In the pickling of stainless steel wire, solutions used include nitric-hydrofluoric acid mixtures, nitric acid, sulfuric acid and special descaling salt solutions. Depending on the composition of the stainless wire and final properties desired, the pickling solutions are kept at various elevated temperatures.

To support the wire during pickling and cleaning operations, many steel mills use pickling "hooks" cast in type CN-7M stainless alloy, which has high resistance to corrosive solutions. The complex shape of the hook, and the severe service to which it is exposed, make integral cast construction more economical than fabrication by other methods.

Continuous Pickling — At the Pennsylvania plant of a steel producer, silicon steel strip for electrical applications and stainless steel strip for a variety of uses are pickled in continuous setups. The strip is fed as an endless ribbon through degreasing, rinsing, acid pickling, and rinsing tanks to remove mill scale and metallic oxides.

The two products are handled in separate pickling lines, but single-stage centrifugal pumps of the horizontal end-suction type, made of cast type CN-7M stainless alloy, handle all the acid, from the storage stage through the disposal of spent acid.

Silicon Strip — In the silicon strip pickling process, 10 per cent sulfuric acid is unloaded from tank cars and delivered to storage by stainless alloy pumps and valves. From storage it flows by gravity into the pickle tanks where it is diluted.

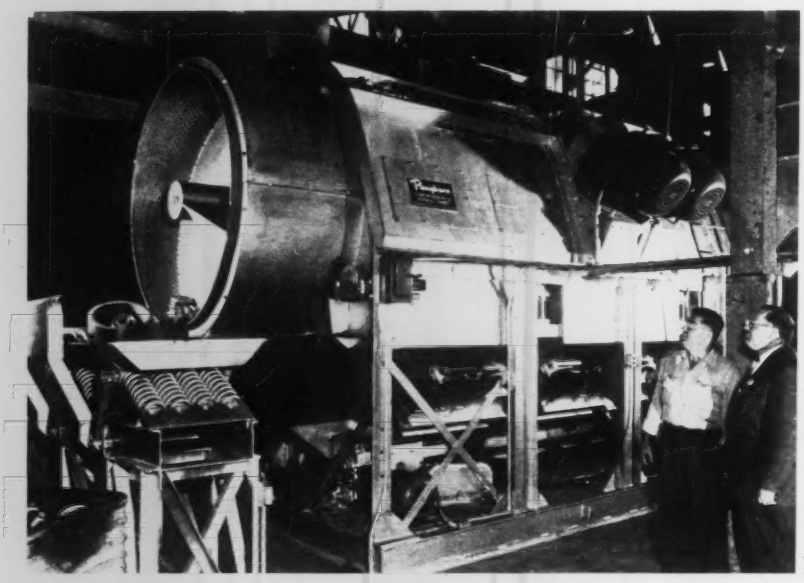
After pickling is completed, the spent acid is pumped into a gravity sewer leading into a collecting tank.

Stainless Strip—In the pickling of stainless steel, the concentrated acid flows by gravity from the storage tank to the pickling tanks where it is mixed to form a solution of about 1-per-cent hydrofluoric and 3-to-4 per cent nitric acid, which is used at 150° F. The spent mixture from the "stainless unit" pickling tanks is pumped to the common collecting tank, into which also is pumped spent acid from the silicon steel pickling tank.

This mixture is pumped to another tank in which a neutralizing milk of lime solution is added. Stainless alloy pumps and valves are used to recirculate the acid and milk of lime mixture in the neutralizing tanks. The neutralized mixture is pumped by a cast iron pump to a dumping area.

Performance—Eight pumps made of type CN-7M alloy were installed, starting in 1943. It is estimated by the steel company's engineers that maintenance costs of repair parts in the intervening 12 years have been about equal to the costs of two new pumps.

The engineers estimate that life of alloy parts in acid neutralizing service is about ten years.



The drum at the exit end of the Rotoblast barrel is spirally sealed from blast action. From it the cleaned castings emerge onto a vibrating conveyor

Shotblasting Cuts Costs

Shot peening's first cousin is proving its worth in volume production cleaning. Further advantages over batch methods were found in the use of this continuous system

CONTINUOUS blast cleaning is eliminating handling time and reducing costs of large volume production at International Harvester Co.'s Construction Equipment Div., Milwaukee.

A Rotoblast barrel (it's 72 in. in diameter) replaces seven other machines and two batch barrels, cuts labor requirements by one third, takes less floor space, and reduces maintenance.

Workload—The plant normally turns out more than 400 tons of gray iron castings daily—the majority is sent to the company's Melrose Park Works and Tractor Works in Illinois. The Continuous Flo barrel, made by the Pangborn Corp., Hagerstown, Md., is cleaning about 10 tons of castings per hour. It can handle up to 16 tons.

Castings range up to 28 in. in length; foundry parts include 200-lb diesel heads, 140-lb steering drum castings, small track idlers, medium size gear housings, sprockets, gear housing and engine front covers, clutch and transmission housings.

Plan—The barrel, which has been integrated as a part of the foundry millroom operation, handles a steady flow of work, including castings from shakeout, forgings which have been heat treated, and stampings from presses.

Because the Rotoblast wheels throw about 100,000 lb of steel abrasive per hour and because the operation is continuous, particular attention has been paid to the accessibility of wearing parts. New abrasive can be added while the machine is in operation.

Moving Time Pared

Use of mobile crane cut time required to move battery of presses 62.5 per cent

MOVING equipment even a short distance in the plant can be a lot of trouble. Low ceilings, cramped aisles, and lack of overhead crane facilities are frequent problems.

Royal McBee Corp., Athens, Ohio, ran into that kind of trouble when a battery of nine offset presses had to be moved from the first to the second floor of its plant. Dismantling the presses or moving them on roller skids seemed the only solution.

Time Cut in Half—Fortunately, someone came up with the idea of using a mobile hydraulic crane. Widely used for lifting and transporting engines, it was fitted for the job.

Estimates of dismantling the heavy presses or moving them on roller skids ran to four or five days. Using the mobile crane cut the moving time to one and one-half days.

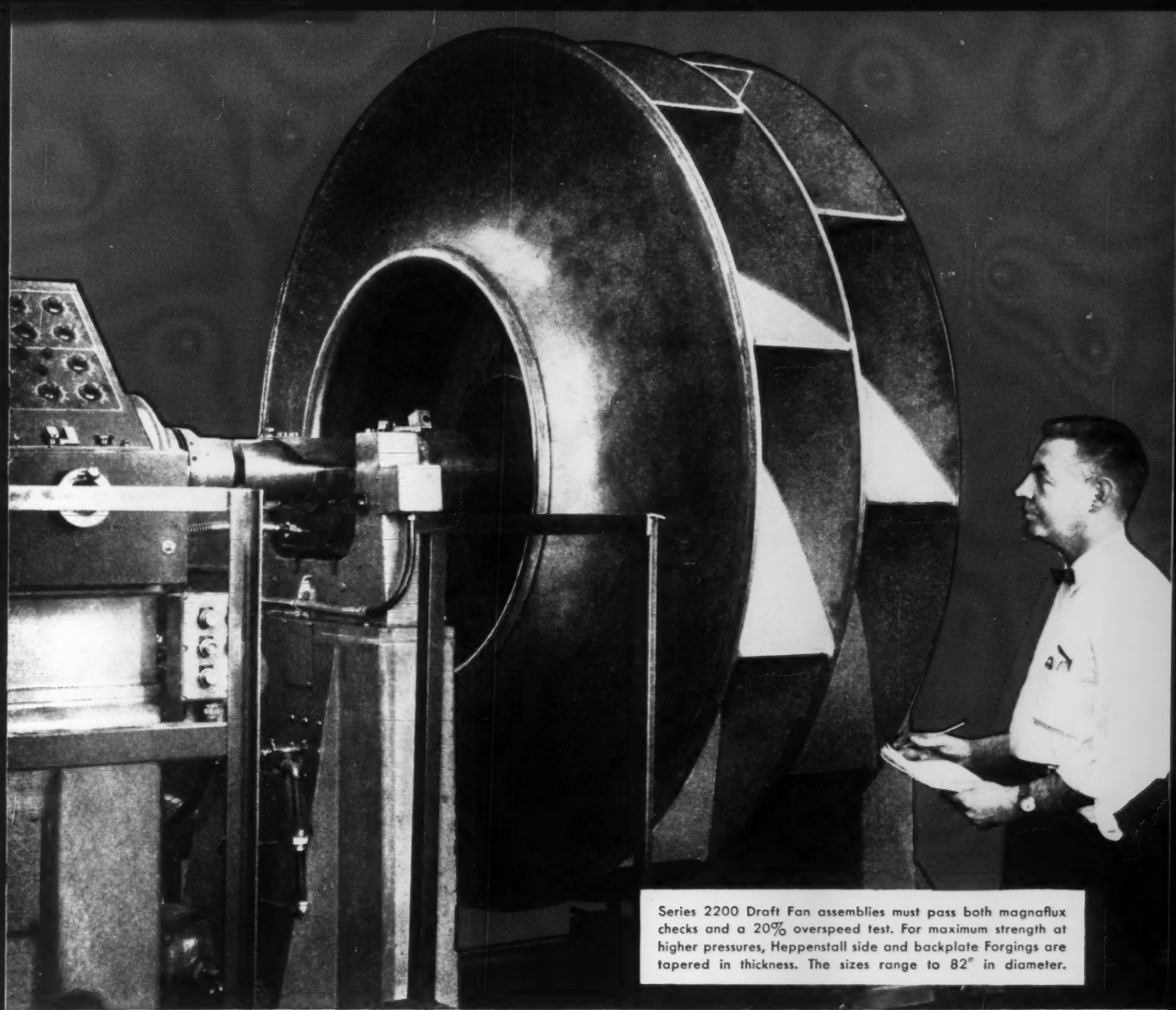
Royal McBee management feels the mobile crane, made by Ruger Equipment Co., Uhrichsville, Ohio, more than paid for itself the first time it was used.

Save Your X-Ray Films

There's money in your old x-ray films. Handy & Harman, New York, has inaugurated a service to recover their silver content.

You have two options. The company will purchase the film on a per-pound basis or will process it as a refining lot (a common practice for precious metal scrap). On a refining lot basis, the shipper receives the full assay value of the recovered silver, less a specified refining service charge. The recovered silver is paid for at the prevailing market price, now about 90 cents a troy ounce.

Handy & Harman has installed special equipment in several of its processing plants to handle the silver recovery. First step in the salvage procedure is to completely destroy all film. That should be of particular interest to companies with classified government projects.



Series 2200 Draft Fan assemblies must pass both magnaflux checks and a 20% overspeed test. For maximum strength at higher pressures, Heppenstall side and backplate Forgings are tapered in thickness. The sizes range to 82″ in diameter.

To be sure...

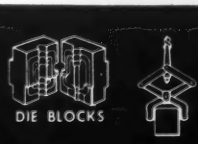
Westinghouse uses Heppenstall Forgings for its Series 2200 Mechanical Draft Fans

"We use Heppenstall Forgings for our Series 2200 . . . the forgings machine well and stand up under the various processes that we subject them to in preparing them to our specifications. When you combine quality with reliability . . . it answers our desires." So says Mr. J. E. McDonald, Manager of Engineering, Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Massachusetts.

In the series 2200, Heppenstall Forgings are used for the side plate, center plate with hub, back plate and fan shaft. This is the first fan ever to provide the advantages of "airfoil" blading to single stage blowers in a range of pressures from 45″ to 90″ of water, at motor speeds of 1800 RPM.

Heppenstall Forgings, in any shape you may require, are made from special Heppenstall open hearth carbon and alloy steels, or high alloy and heat resisting stainless steels from Heppenstall Electric Induction Furnaces. Before shipment, each forging passes rigid inspection and ultrasonic testing. This assures you a trouble-free component of your product.

Find out how Heppenstall Forgings can build extra quality and performance into your equipment. Ask your Heppenstall Company Representative.



MATERIALS HANDLING EQUIPMENT

KNIVES

FORGINGS

RINGS

BACK-UP ROLL SLEEVES

HEPPENSTALL COMPANY

PITTSBURGH 1, PENNSYLVANIA

PLANTS: Pittsburgh, Pennsylvania • Bridgeport, Connecticut
Indianapolis, Indiana • New Brighton, Pennsylvania

MIDVALE-HEPPENSTALL COMPANY

Nicetown, Philadelphia 40, Pa.

Empire-Reeves adopts high pressure natural gas to atomize fuel oil in its open-hearth burners. The system offers impressive savings over steam atomization

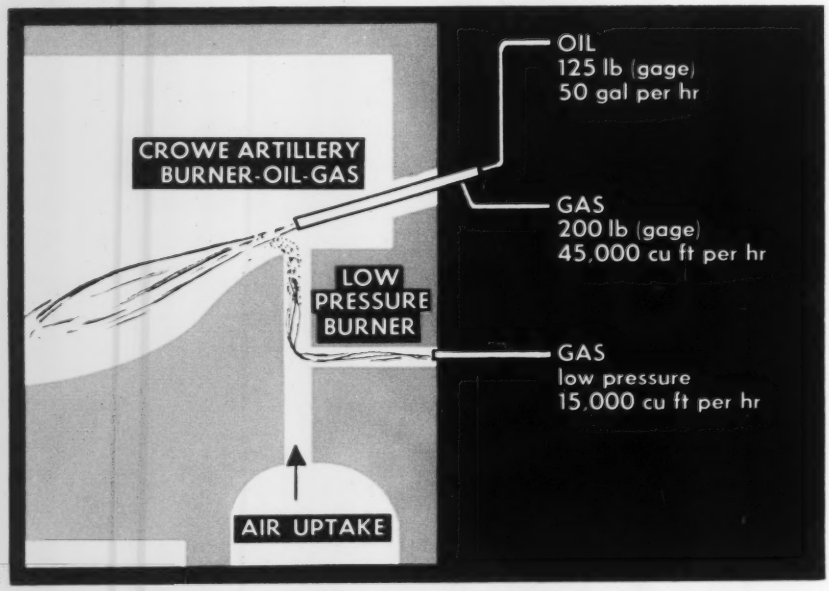


Fig. 1—Application of open-hearth burner using natural gas under high pressure to atomize fuel oil, and secondary burner utilizing natural gas under low pressure to provide a source of luminous carbon particles

Gas Atomizes Open-Hearth Fuel

By V. B. THOMPSON
Ohio Fuel Gas Co.
Columbia Gas Systems Inc.
Mansfield, Ohio

EMPIRE-REEVES Steel Corp. has converted the basic open hearth furnaces at its Mansfield, Ohio, plant from oil-steam to oil-natural gas firing. Empire-Reeves is a subsidiary of Universal-Cyclops Steel Corp.

The conversion has reduced costs, increased production per furnace, improved products, increased fuel input, lowered flux requirements and produced a hotter flame for faster meltdown of cold steel.

Five of the furnaces are of 155-ton capacity; one is a 180 tonner, and one is a 125 tonner. Following a plan worked out jointly by Empire-Reeves and Columbus Gas System's Ohio Fuel Gas Co., natural gas under high pressure (200 psig) is used to atomize fuel oil as it is injected into the furnace combustion chamber. Fortunately, 200-lb gas pressure was available directly from the gas company lines. Otherwise, compressors would have been necessary.

Atomize with Gas—Before the conversion, the oil was atomized by injecting high pressure steam into the oil stream in the burner mixer. Once in the chamber, the atomizing gas ignites instantaneously, adding a thermal cracking effect to the mechanical atomizing. Carbon particles are liberated quickly from the oil and raised to incandescence, producing a highly radiant flame. This speeds the transfer of heat to the charge.

During the melting period, when the heat input rate is the highest, fuel proportions are 90 per cent

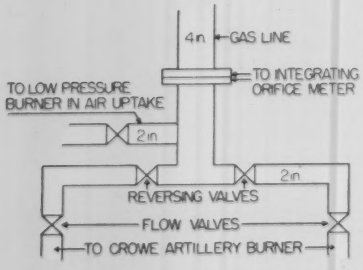


Fig. 2—Schematic: Gas reversing stand

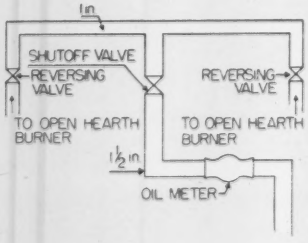
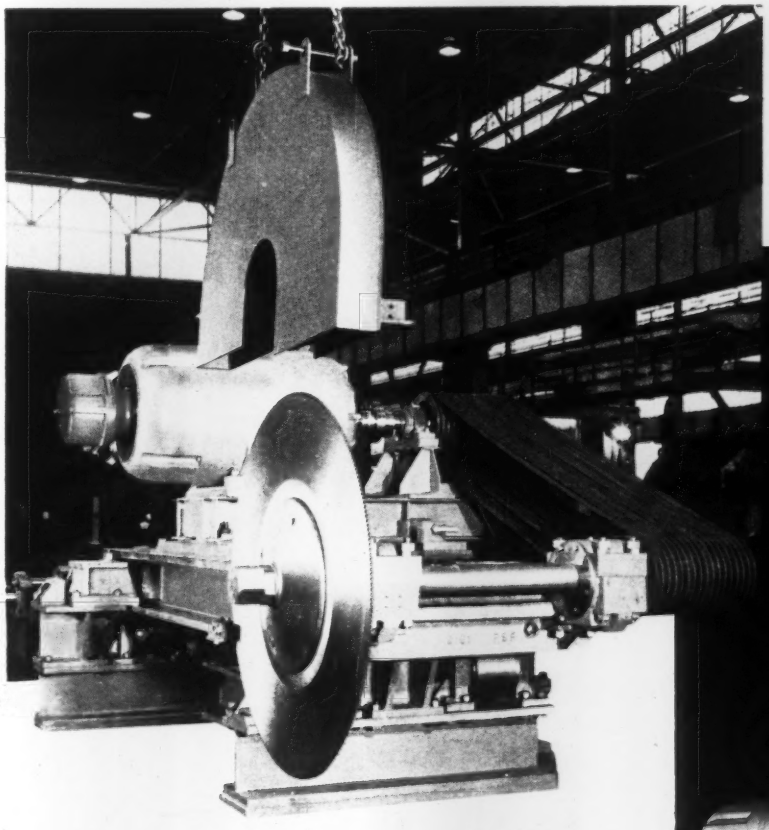
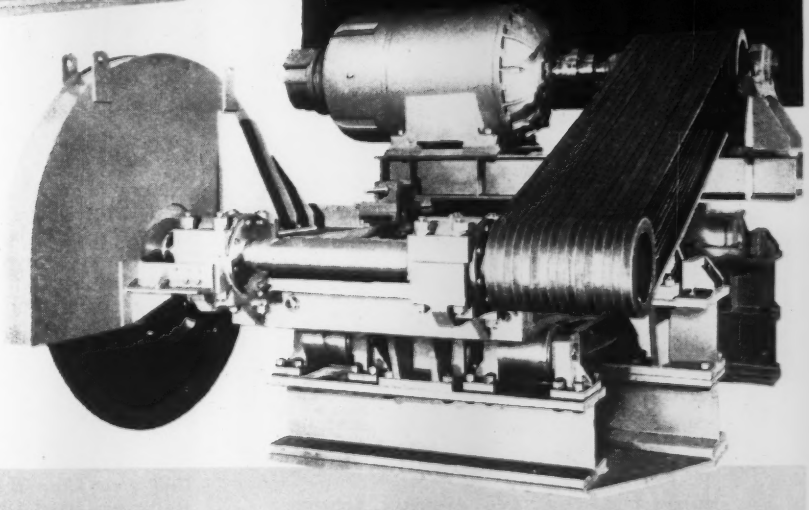


Fig. 3—Schematic: Oil reversing stand



Auxiliary Equipment by Pittsburgh

HOT SAW



Ferrous and non-ferrous metal processing plants have numerous pieces of auxiliary equipment built by Pittsburgh Engineering Division. The Hot Saw illustrated typifies the manufacturing versatility of our shop. Specifications include: cuts up to 7" O. D. carbon steel solid rounds at approximately 1000° F.; direct belt drive; hydraulic feed control; and low maintenance costs. Consult Pittsburgh for your special requirements in auxiliary mill equipment.

Hot Saw with 66" diameter blade

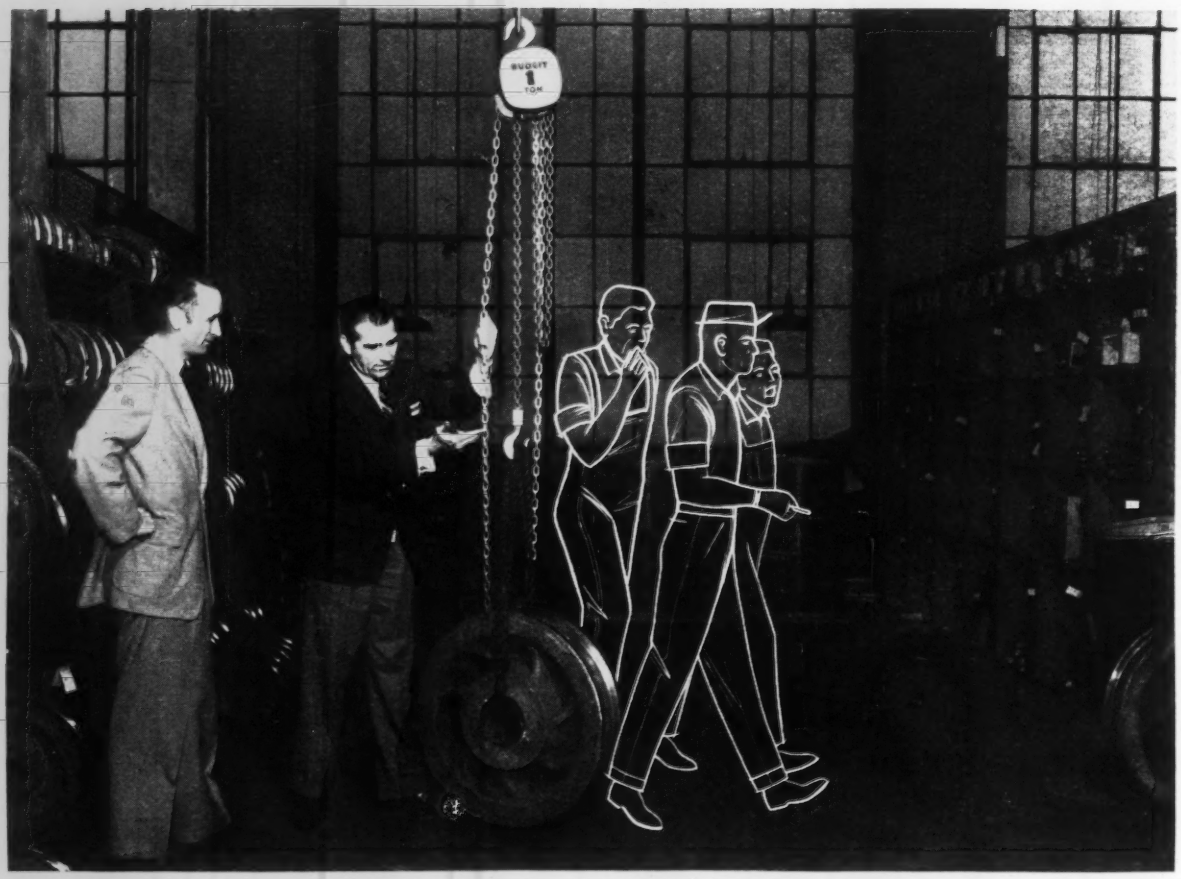
"Electric and open hearth steel castings from 1 lb. to 100 tons"

Pittsburgh
ENGINEERING & MACHINE

Division of Pittsburgh Steel Foundry Corporation

P. O. BOX 986, PITTSBURGH 30, PENNSYLVANIA

PLANT AT GLASSPORT, PENNSYLVANIA



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In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

gas, 10 per cent oil. During the refining period, when the firing rate is reduced by about 20 per cent, the proportions have to be reduced to 50 per cent gas and 50 per cent oil.

Faster Production — Replacing endothermic steam with exothermic natural gas has produced greater heat inputs per hour and higher flame temperatures that result in faster meltdown of the charge. Because the products of combustion per unit of fuel are substantially less with natural gas, a greater fuel input rate is possible with the existing draft, making additional blower capacity unnecessary. The result has been an increase in production of about 0.5 ton per hour per furnace.

With a substantial portion of the heat input now supplied by sulfur-free gas, the total sulfur content of the steel is substantially reduced —the oil used for firing averages about 0.75 per cent sulfur. Sixty-five per cent of the total heat input is now sulfur-free gas; so the steel is exposed to only 35 per cent as much sulfur in the fuel as when oil was atomized with steam.

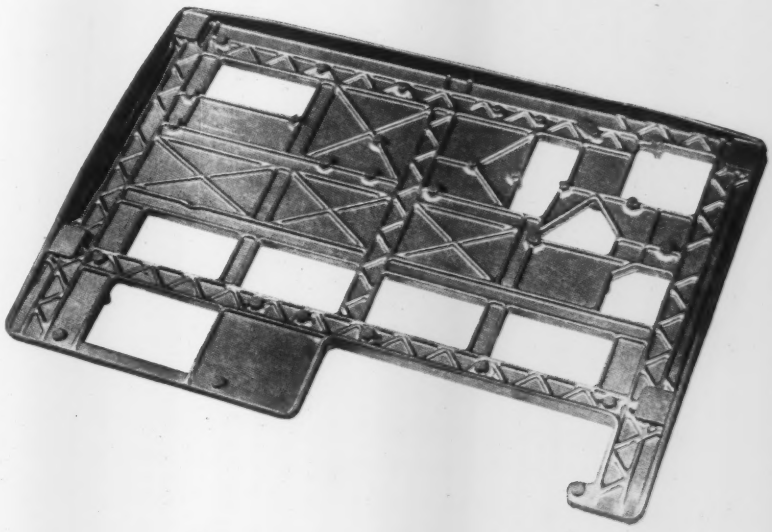
Inexpensive—The cost of converting was so low that it was recovered in savings in the first month. Fuel savings alone amounted to 23 per cent. In addition, the steam saved was used elsewhere and bolstered an undercapacity system, putting off the necessity of expanding the boiler plant.

The speeded up refining phase resulted also in a saving in fluxes.

The decrease in the oil consumption reduced the volume of oil in storage, reducing capital tied up in oil inventory by better than 50 per cent.

Improvement—Empire-Reeves engineers are working at supplying a still higher percentage of the total heat input from natural gas. By changes in furnace design, method of fuel input, and better operation, they have already raised this proportion to 90 per cent on some of their furnaces.

To do this, they are introducing raw gas into a passage in the air uptake chamber and allowing this low pressure cracked gas to enter the furnace just under the firing end of the burner. This supplies luminous carbon particles and reduces the amount of oil required.



EXCELLENT BASE FOR PROFITS

This ninety-six pound casting was made for the National Cash Register Co. of Nodulite®, Hamilton Foundry's ductile iron. The casting forms the base for the new Post-Tronic Accounting Machine. It measures 37½" by 23½" with sections varying from ¼" to 1½". Ductile iron was chosen for this part because of its ductility, dimensional stability, rigidity, and machinability.

Sharp pencil buyers know that the *ultimate* cost of a casting rather than the purchase price is most important to the cost of the end product. Dimensional accuracy, uniform machinability, fine surface finish, low rejects and delivery of orders on schedule result in castings at lowest ultimate cost and insure your reputation for product quality.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules —will be met.

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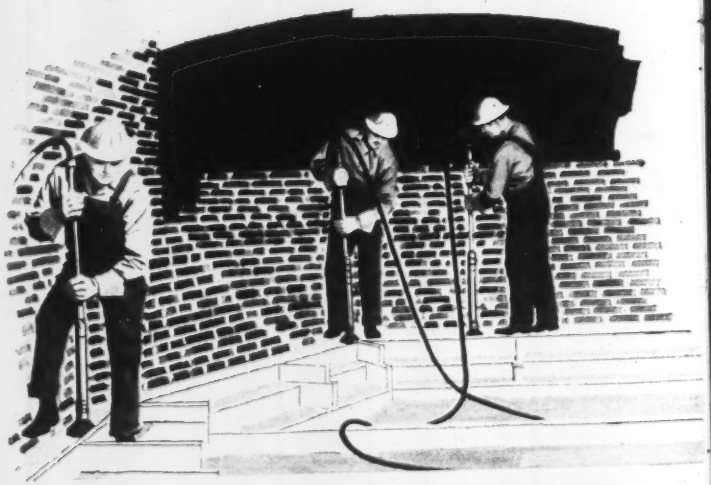
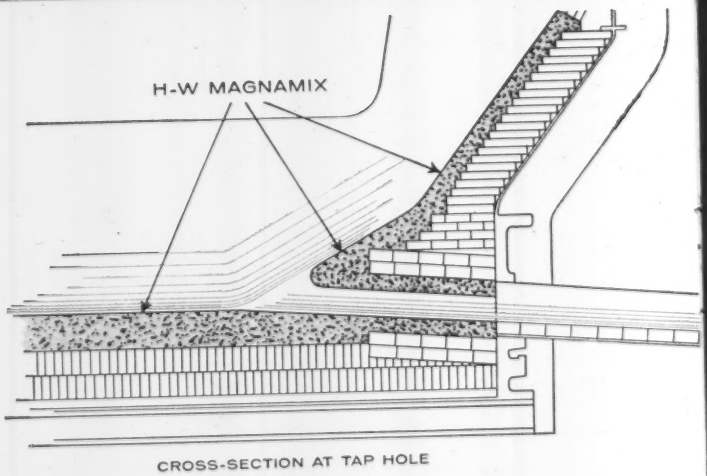
H-W C-MIX



The unmatched combination for longest service and lowest maintenance cost

H-W MAGNAMIX



CROSS-SECTION AT TAP HOLE

RAMMING MIXTURES

basic hearths

H-W C-MIX (high purity seawater periclase) used for contour-rammed open hearth and electric furnace bottoms greatly reduces furnace downtime, saves labor and avoids burning-in sacrifice of refractory superstructure. And with its measurable margin of superior properties, costs are decidedly lower and furnace availability is greatly increased.

- **High Magnesia Content**—Made from high purity seawater periclase with the magnesia content over 92%, H-W C-Mix best withstands the corrosive action of highly basic slags.
- **Stable**—It is fully converted to periclase and has excellent volume stability with negligible shrinkage at highest operating temperatures.
- **Hydration Resistant**—H-W C-Mix is unique in its high degree of resistance to hydration.
- **Strong**—High strength over the entire range of steel furnace temperatures accounts for its unusual resistance to erosion.
- **Dense**—High density and low permeability retard penetration by molten metal and corrosive slags.
- **Economical**—H-W C-Mix provides the most durable monolithic hearths with low installation cost.

H-W MAGNAMIX of 80% magnesia content stabilized as periclase, is made from dead-burned Washington magnesite. It is particle sized to secure maximum density. While H-W Magnamix is dependable for making new bottoms, it is especially adapted for bank maintenance, patching deep holes and repiping tapholes. It sinters into a hard dense monolith in a very short time at approximately 1000°F. lower than operating temperatures.

- **High Magnesia Content**—It is used without the addition of slag or scale, thus avoiding dilution of its high magnesia content.
- **Dense**—As rammed into place, it becomes exceedingly dense and impermeable. When heated to operating temperatures, its density is further increased and a homogeneous monolith is formed.
- **Strong**—H-W Magnamix has a strong cold set with the unusually high crushing strength of 1500 psi.
- **Durable**—Its excellent resistance to erosion accounts for its splendid records and wide adoption in taphole service.
- **Easy To Use**—It has superior properties for patching large holes in banks and bottoms, and is applied by air-ramming, gun placement or by hand in hot patching.

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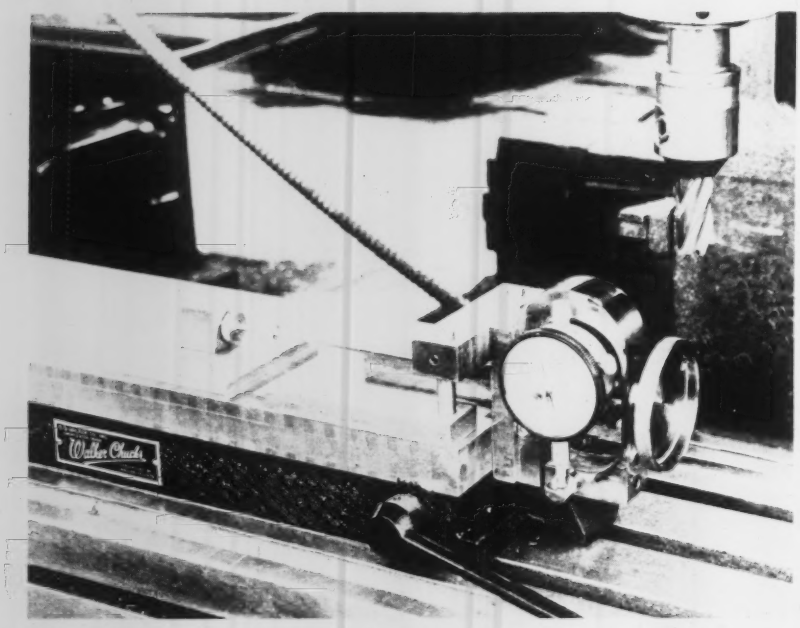


This device records force required to slide steel block on magnetic chuck

Test for Magnetic Chucks

Simple device developed by a chuck manufacturer tests gripping power. Load is indicated on mechanical force gage. Available range is 0 to 50,000 lb

NEED a simple method of testing the gripping power of magnetic chucks? A device developed by O. S. Walker Co., Worcester, Mass., may be the answer.

Walker engineers say chuck failure occurs when material slides on the chuck bed rather than being pulled from it. For this reason, the testing unit is designed to record the load required to slip a steel block of prescribed dimension. It is read on a mechanical force gage made by W. C. Dillon & Co., Van Nuys, Calif.

How It's Made—On the chuck bed, a steel block 3 in. square and ¼ in. thick is connected by a shaft to the testing mechanism. The mechanism consists of two steel plates anchored magnetically to the bed with the gage bracket mounted vertically to these anchors and butted against the end of the bed.

The force gage is seated vertically on this bracket. At the right of the gage is a small handwheel which is connected to the testshaft. It is threaded through the gage bracket but not the gage itself.

How It's Used—As the handwheel is rotated, pressure on the test block gradually increases until the block begins to slide. This force is indicated by the gage.

Roger W. Cowles Jr., of O. S. Walker Co., says that ratings upwards of 200 lb before slippage have been exerted on the testing setup illustrated above—the gage will check loads between 0 and 250 lb. Other gages can be used with the testing unit which will indicate loads as high as 50,000 lb.

Cuts Handling Costs

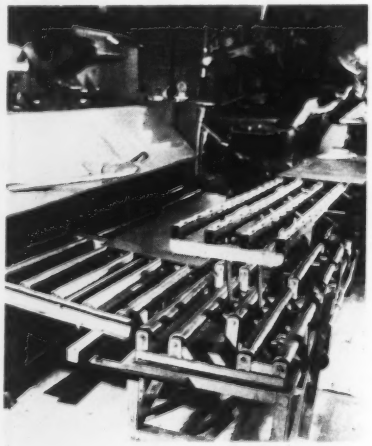
Transfer conveyor moves sheet steel from shear to press brake. It paces the handling cycle

AN elevator transfer conveyor solved the problem of moving sheet steel from a shear to a press brake at Westinghouse Electric Corp.'s TV-Radio Div. and trimmed 75 per cent off handling costs.

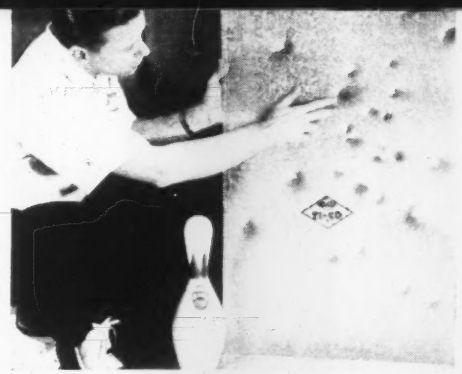
Made up of channel mounted wheel rollers, the conveyor is elevated by an air cylinder from its "down" position between the cylindrical rolls to its "up" position as shown in the photo. The shear is at left, the press brake at right.

Operation Sequence — The shear operator paces the conveyor cycle:

1. The first sheared sheet is conveyed by gravity over the cylindrical rolls to a position above the transfer conveyor.
2. When the sheet hits the stop bars, a microswitch is tripped.
3. The air cylinder elevates the transfer conveyor to the "up" position.
4. The sheet moves by gravity into position for the press brake operator.
5. A mechanical stop holds the second sheet until the transfer conveyor return to "down" position.
6. An electrical interlock holds the transfer conveyor in the "down" position until the press brake operator uses the first sheet.



Transfer conveyor in the raised position. Sheet is ready for press brake operator at right. Second sheared sheet is held by mechanical stop until conveyor is lowered



Three-time ABC winner, famous bowler BILL LILLARD slams in strike after strike sending ball and pins flying against piece of TI-CO set up in pit. Close up examination by Bill shows plenty of punishment but no flaking. TI-CO's zinc coating rolled with the punch!

BOWLING CHAMP FAILS TO FLAKE INLAND TI-CO®!

Switch to **TI-CO** Non-Flaking Galvanized saves manufacturers up to 15% in Production Costs.

A well-known garage door manufacturer dispensed with plating operations—reduced costs 10%. A leading furnace manufacturer saved $20 per thousand parts produced by eliminating cleaning and painting. A company making roller gravity conveyors cut out similar operations. These are just a few of many case histories of manufacturers who realized important savings and improved their product when they started using TI-CO Galvanized Sheets.

Whenever a product requires the strength of steel, plus corrosion resistance, Inland TI-CO is the most satisfactory . . . the most practical . . . the most economical material to use. That's because TI-CO is produced with a zinc coating that will not flake even under the toughest conditions. The coating stretches with the base metal during fabrication. Deep drawing, brake or roll forming, crimping, stamping, lock-seaming even severe spin-drawing . . . TI-CO takes them all in stride with no flaking or peeling. With TI-CO there's no need for costly dipping or touching up. And the uniform, bright spangled finish adds to the over-all attractiveness of the product.

If you're manufacturing or designing a metal product that requires corrosion resistance, consider TI-CO Galvanized Sheets. Manufactured in coils or cut lengths up to 60″ widths, gauges 8 to 30 inclusive. Consult your local steel distributor or Inland sales representative. Write today for a free informative booklet on TI-CO.

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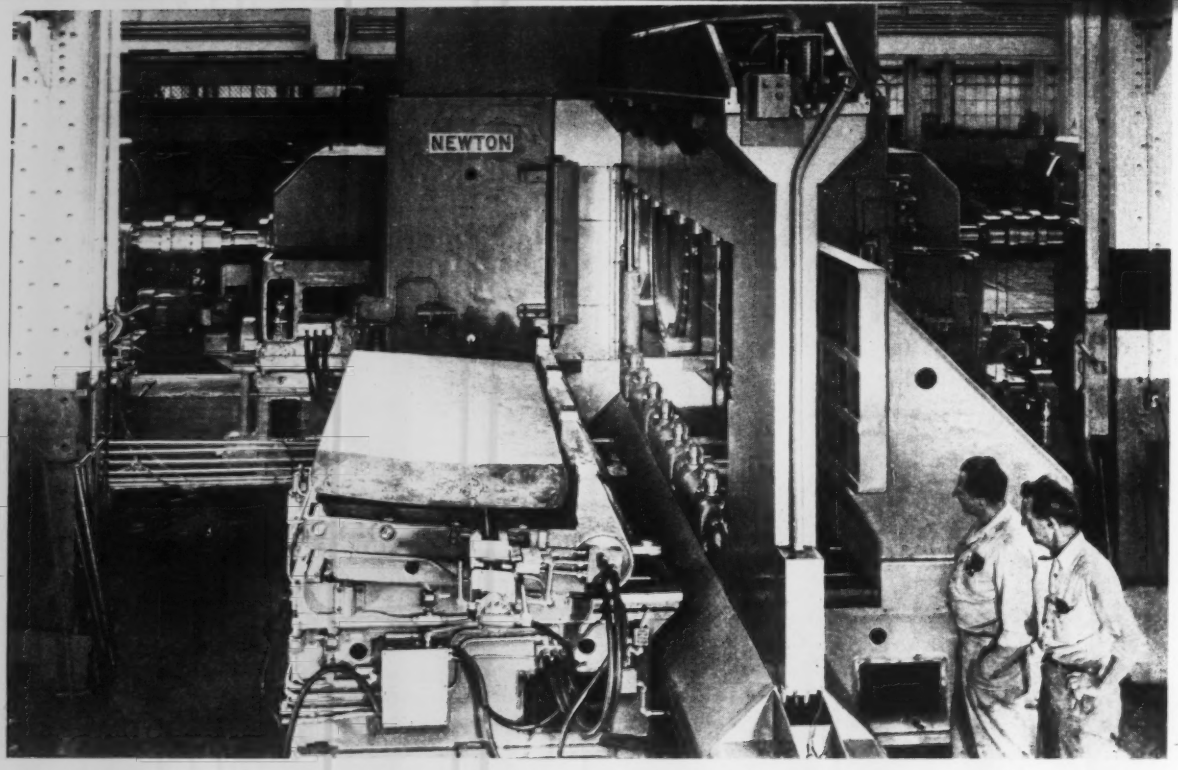


Billet on loading leaf is ready for tiltup into fixture. Pins (top and bottom) grasp billet at edges and carry it through cutters. Each is driven by a 1000-hp electric motor

Billets Scalped Six Times Faster

Machine cuts both sides at once in preparation for rolling of aluminum products. Cutters are easily removed for sharpening. Machine can be adapted for steel industry operations

A BILLET scalper with 75-in. cutters boosted the production of the operation more than 600 per cent at Kaiser Aluminum & Chemical Co., Ravenswood, W. Va.

The machine turns out raw material for the rolling of aluminum sheets, strip, and foil. Designed by Consolidated Machine Tool Div., Farrel-Birmingham Co. Inc., Rochester, N. Y., it will also handle most ferrous metals.

Savings — The major advantage is the reduction of processing time. Single spindle machines take 10 minutes to scalp a 14-ft billet, one side at a time. The new duplex mills both sides in less than 90 seconds.

Another saving: Blade grinding time has been cut from three weeks to a few hours by using Wesson preset cutters. Setup time has been reduced to 45 minutes, vs. 12 to 15 hours for the old machine.

A byproduct is better quality. It isn't necessary to flip a billet, so its surfaces aren't damaged as much. (Surface scratches can show up as mile-long blemishes in the rolled product.)

Scalping — A rough billet rolls from a table onto a loading leaf. It raises the billet vertically, slides it forward and sideways into a fixture. When the billet is automatically centered, work points on top and bottom clamps bite into its edges.

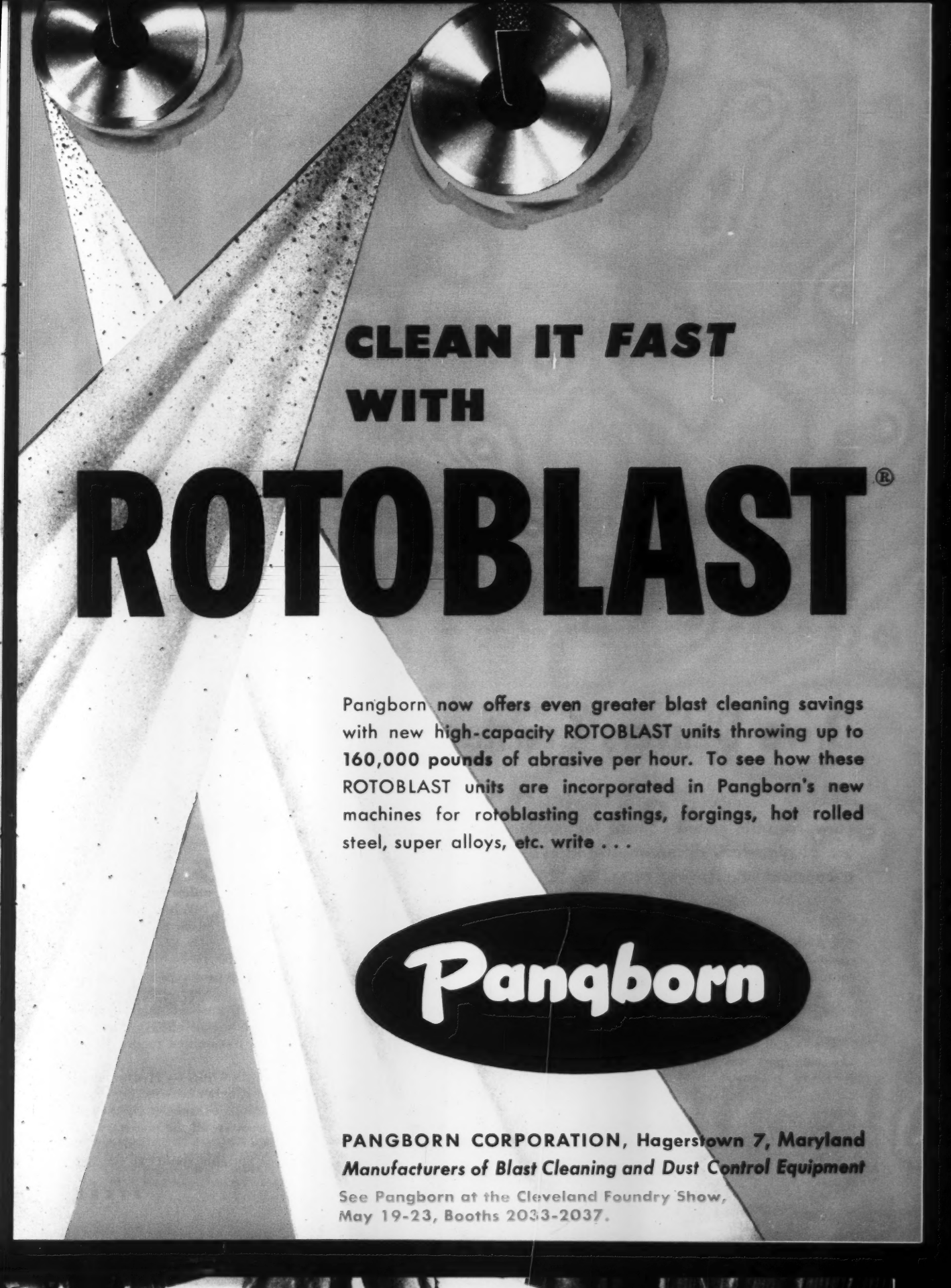
The fixture and billet then move toward cutters. If the cutter heads won't admit the billet, the fixture stops. When the cutter opening is properly adjusted, fixture feed is reduced and cutting begins. Cutter speed is fixed at 600 rpm, giving a surface speed of 11,800 sfpm.

Cut Depth — The operation removes about $\frac{5}{8}$ in. of metal from each side of a billet. Stock removal is held at 5000 cu ipm.

Each cutter has a shroud that blows chips downward. A conveyor under the machine carries chips to a shredder.

Tooling — Cutters have three parts: A solid steel body ring, 44 steel blocks, and 44 removable magazines which hold the blades. Each cutter (complete with 44 blades) is easily removed from the spindle face.

Blades can be sharpened while still in the magazine, eliminating the need for readjustment. Compound angles for the blade are in the magazine which is also used as a grinding fixture. A magnetic chuck on a surface grinder will hold several. Wedges fix the blades firmly in each magazine.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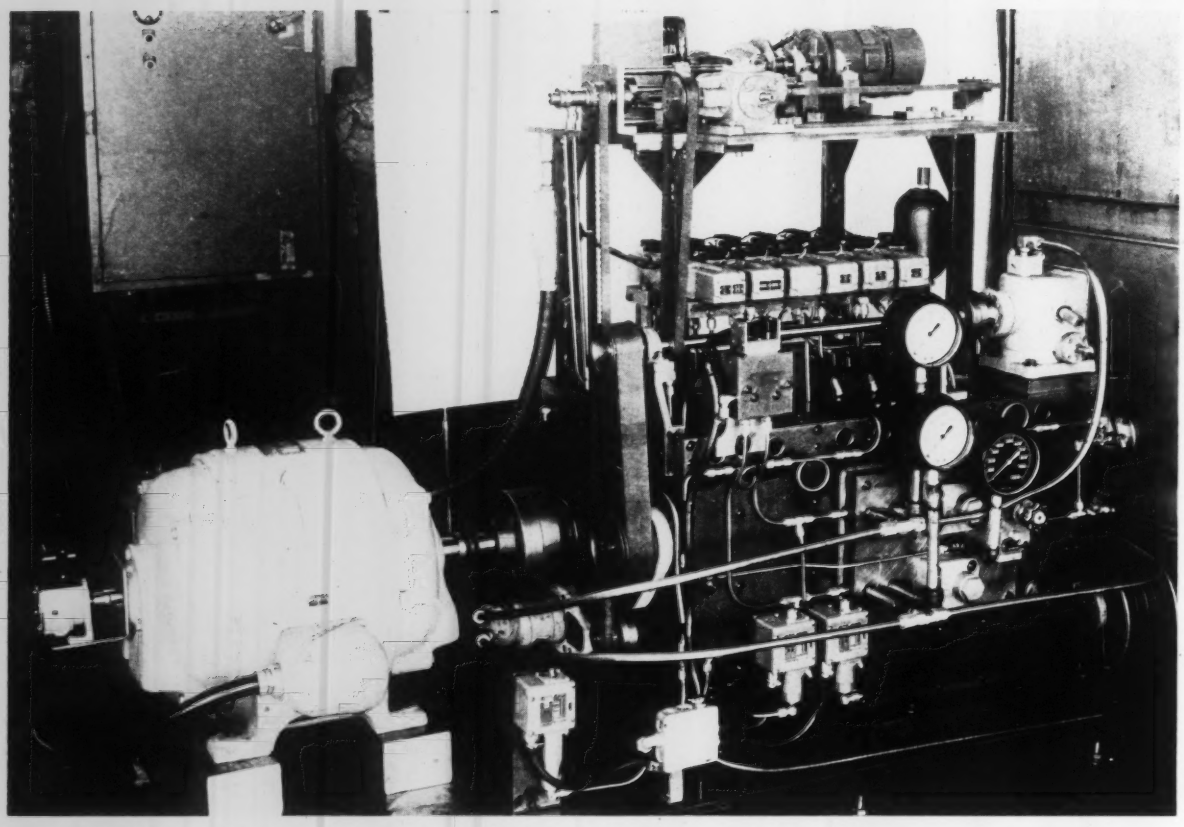

Prototype of hydraulic-mechanical, variable speed drive under test at the Bullard Co. Speed change controls are on top of the unit

Drive Delivers Constant Horsepower

New variable speed control for machine tools is based on use of planetary differentials and hydraulic clutches. It has a constant horsepower range of 13.5 to 1

AN ANSWER to the need of constant horsepower, variable speed control for machine tools is offered by a new hydraulic-mechanical drive that demonstrates smooth transition of output speeds.

The face of a large diameter, disc-like steel part was machined from perimeter to center at a constant cutting speed and constant horsepower. Cutting speed was reduced to zero with a carbide tool buried in a cut. The speed was immediately increased to 300 sfpm (with the tool still buried in the cut) without damaging tool or work.

The Drive—The tests were made on a vertical turret lathe with a 40-hp prototype unit by the Bullard Co., Bridgeport, Conn., which developed the drive.

Bullard says the prototype model, which has a constant horsepower range of 13.5 to 1, has passed all tests. At present, the control system is being refined, and the design of the commercial "package" is in progress.

How It Operates—The drive combines planetary differentials with positive displacement hydraulic units. The nucleus of the drive is two planetary differentials that are interconnected. While one is operating, the other is preconditioned to take over where the first left off, and vice versa.

The 40-hp prototype uses two additional planetary differentials which are connected so that three separate but continuous ranges of speed are transmitted to the output shaft.

Hydraulic Units — Hydraulically operated clutches are used in various combinations to transfer the flow of power between all the planetary differentials. Gearing is designed to produce variable speeds at the out-

Steel plant reports on use of B&W Kaocrete-32 in critical sections of electric furnace roofs:

•36% saving in installation time

•42% increase in roof life

•20% reduction in refractory costs

For further information on how you can profit with B&W Kaocrete-32 in electric furnace roofs, consult your B&W refractories representative or send for technical bulletin RR-46.

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RB99

How does this appear on your monthly statement?

In its present form (if it appears at all), it would have to be considered in the loss column because that's exactly what it is. Very often though, you'll find that when you give that pile of "waste" a chance, you can make money from it.

We have discovered time and time again that these slumbering piles of scrap contain valuable precious metal waste. If this material is kept apart from your general scrap and sent to Handy & Harman, our Refining Division can recover the full value of the precious metal . . . and return a worth-while payment to you.

At the right is a partial list of valuable waste sources: If you think you are throwing or giving away waste materials that might have some precious metal value, call or write the Handy & Harman refining station nearest you. We will be glad to tell you if there is money in it.

CHECK LIST FOR REFININGS

Plating Operations

Silver Plating Solutions
Gold Plating Solutions
Silver Precipitates, Sludges & Sediments
Gold Precipitates, Sludges & Sediments
Silver Coated Copper Wire & Racks
Gold Coated Copper Wire & Racks
Filter Pads
Silver Anode Ends
Silver Tank Scrapings

Production Operations

Silver Turnings, Chips, Shavings
Silver on Steel Bearings
Silver Steel Turnings
Silver Blanking Scrap, Stampings, Strip, Wire
Silver Grindings
Silver Copper Scrap
Silver Powder Mixtures
Silver Screen Scrap
Silver Solder Scrap
Silver Brazing Alloy Scrap
Silver Contact Scrap
Silver & Gold Bi-Metal Scrap
Silver on Steel, Tungsten, Moly Scrap
Rejected Precious Metal Parts

X-Ray Laboratory

Electrolytic Silver
Silver Hypo Solutions
X-Ray Film

Miscellaneous

Silver Paint Waste, Wipe Rags, Paper, Cans
Silver & Gold on Plastics, Ceramics, Glass, Mica, Quartz, etc.
Silver & Gold on Moly, Tungsten, Wire
Platinum-Bearing Material
Mirror Solutions — Silver Nitrate
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Bridgeport 1, Conn.
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1900 W. Kinzie Street
El Monte, Calif. (Los Angeles)—
330 North Gibson Road
New York 38, N.Y.—82 Fulton St.
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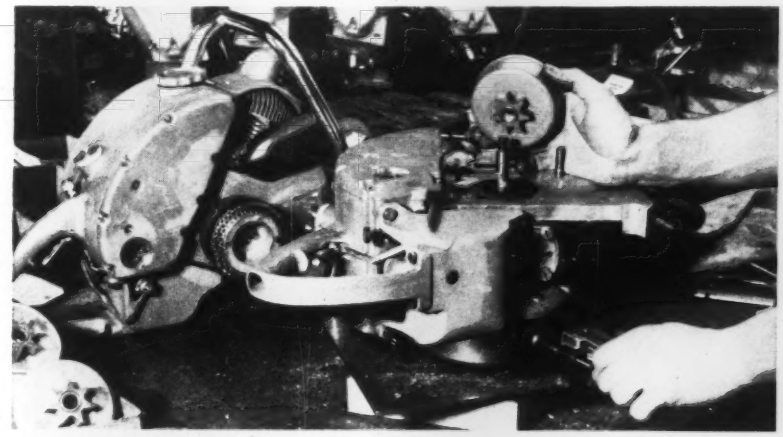
put shaft with no noticeable drop in speed or distinct plateau throughout the range of 0 to 1800 rpm.

The clutch shifting system insures that the power transferring clutch will be engaged before the clutch from which the power is transferred is disengaged. All clutch shifting operations take place at synchronous speeds, and the engaged clutch always unloads the clutch to be disengaged.

Efficiency — Prony-brake tests show an operating efficiency of 87 to 92 per cent for the 40-hp prototype in the 130 to 1800 rpm range. A maximum of 15 per cent of the output horsepower is transmitted by the hydraulic units. During most of the operating time, the hydraulic units are used to only about 25 per cent of their rated capacity.

For development purposes, an electric-mechanical control system with solenoid actuated valves was used for clutch actuation. A hydraulic-mechanical control system is being designed which will require a minimum of electrical equipment and a major portion will be mounted within the drive housing.

The commercial unit will be no larger, and may be smaller, than other adjustable speed drives of comparable horsepower, says Bullard. Apart from its uses in machine tools, the drive is expected to have broad application as a new transmission in transportation equipment.



Seven-tooth sprockets, cut from hot extruded, cold drawn steel bars, are assembled with clutch drums for chain saws powered by gasoline engine

Extruded Shape Cuts Costs

HOT EXTRUDED steel shapes that have been cold drawn to finish size offer the maker of products a way to pare production costs.

Example: The sprocket that drives a chain saw costs about half what it did.

The Trick—The finished tooth form for the sprocket is hot extruded and cold drawn into the bar. Dimensional tolerances of the seven teeth are the same as when they were milled from blanks (1¾ in. in diameter by ⅝ in. thick) which were cut from round bars. The same steel, SAE 8620, is used.

The extruded-drawn bar stock is formed by Jones & Laughlin Steel Corp., Pittsburgh. To finish the sprockets, Lombard Governor Corp., Ashland, Mass., drills and bores a hole for a needle bearing and cuts the piece to length. Work is done on a turret lathe.

The greatest advantage of the extruded stock, say Lombard production engineers, is that the tooth form requires no machining or finishing except deburring after the turret lathe operations.

Process Bonds Bimetallics

A technique for mechanically bonding diecast aluminum auto wheels to cast iron brake drum liners has been developed by the Doehler-Jarvis Div. of National Lead Co.

Designed B.M.I., the process effects a strong bimetallic interlock between the two components, raising heat transfer efficiency in braking action.

Mechanical Properties—Test results indicate the bond has good tensile and shear strength. It is ductile, and in terms of uniformity of properties, it is superior to a metallurgical bond on diecastings, say Doehler-Jarvis engineers.

The B.M.I. bond has been tested and produced with aluminum diecastings and centrifugally cast iron. It can be extended to all diecasting metals (zinc, magnesium, and copper alloys) and can be used for other bimetallic applications, including gray iron sleeves for diecast aluminum engine blocks.

The Process—The bond is made by inserting a cast gray iron brake drum liner into the die cavity of a diecasting machine. The die is closed, and molten aluminum is injected under pressures of 6000 to 10,000 psi to form the wheel and bond it to the brake liner.

Key to Plating Quality

Here's a tip for users of plated steel: The continuity of the coating is more important than plate thickness, say research engineers at Wagner Bros. Inc., Detroit.

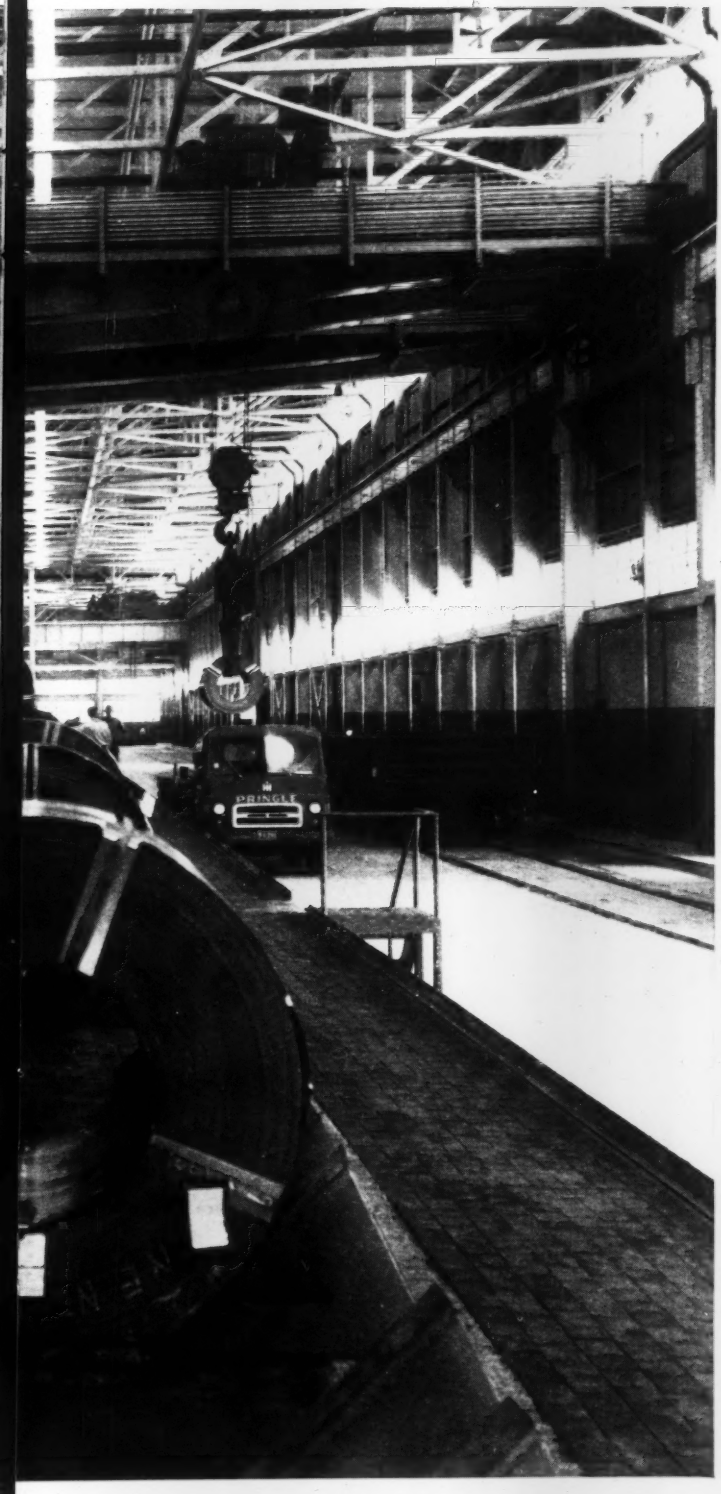
The point is borne out, they say, when thin coatings are put on parts which are buffed prior to plating to remove wheel marks and other blemishes. The base metal is given added protection against oxidation because the surface has continuity.

Tips for Platers—Wagner Bros. claims "pore problems" could be reduced at least 80 per cent "if manufacturers would take as many precautions in plating as they do in paint finishing operations."

Aside from unconditioned metal, the company lists several other reasons for a lack of coating continuity, including: Improper chemical cleaning, airborne dirt, and man-produced contaminants around plating equipment.

Provide the

right speed



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Electronic "Stepless" Control

The answer to better material handling often is not higher speed, but better speed *control*. The right speed may be slow one time, and fast the next.

P&H Electronic "Stepless" Control places just this sort of versatile speed control at the crane operator's fingertips — enables him to select just the right speed for each load: Slow, accelerating lifts . . . fast transporting . . . accurate, damage-free spotting. The load moves smoothly through this wide speed range without "steps" of fixed speeds. There's no lurch — no "gear-shift" — to impose strain on bridge or supporting runway and building structure.

P&H Electronic Control is easier to maintain than other controls. It has 58 fewer wearing parts to replace . . . uses a single, sturdy electronic tube with an average life of *over* 15,000 working hours . . . the same control panel fits cranes of every size . . . and Electronic Control can be applied to AC cranes of any make!

Don't prepare another crane inquiry without investigating this amazing development. Write Dept. 112E, Harnischfeger Corp., Milwaukee 46, Wisconsin.

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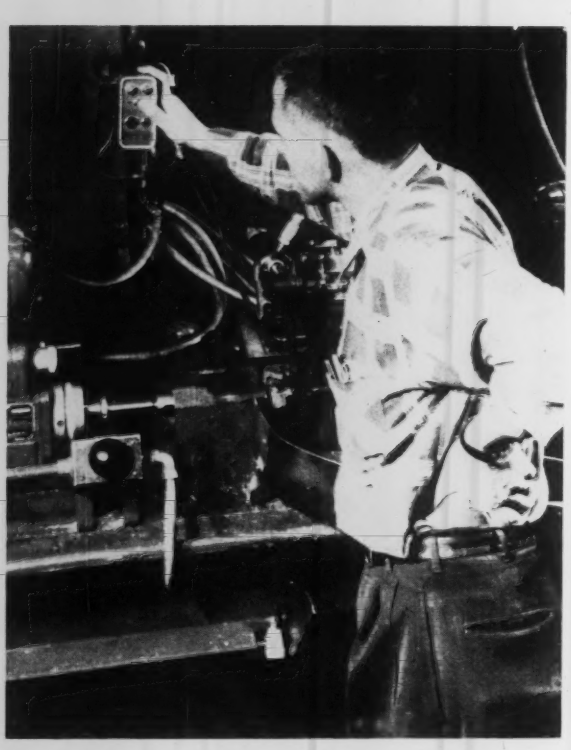


Operator signals for help by turning alarm switch on control box. That turns on flashing red light

Signal is picked up on the control panel by the supervisor who relays machine number to foreman over paging system

System Keeps Tab on Production

Production control eliminates a foreman's paperwork, simplifies accounting, and reduces machine downtime. Michigan firm says it paid for itself in a little more than six months

A PRODUCTION control system called Telecontrol is hailed as a big step toward the automatic factory.

It tells immediately what's happening at every production machine and eliminates the foreman's paperwork. Management gets realistic cost and rate facts faster.

Benefits — Hancock Mfg. Co., Jackson, Mich., installed Telecontrol about a year ago. Two men now do the production control work of 16. First year's savings: $80,000, plus $20,000 less downtime. (Since the savings came from overhead transferred to production, Hancock points out that the effect on profits is doubled.)

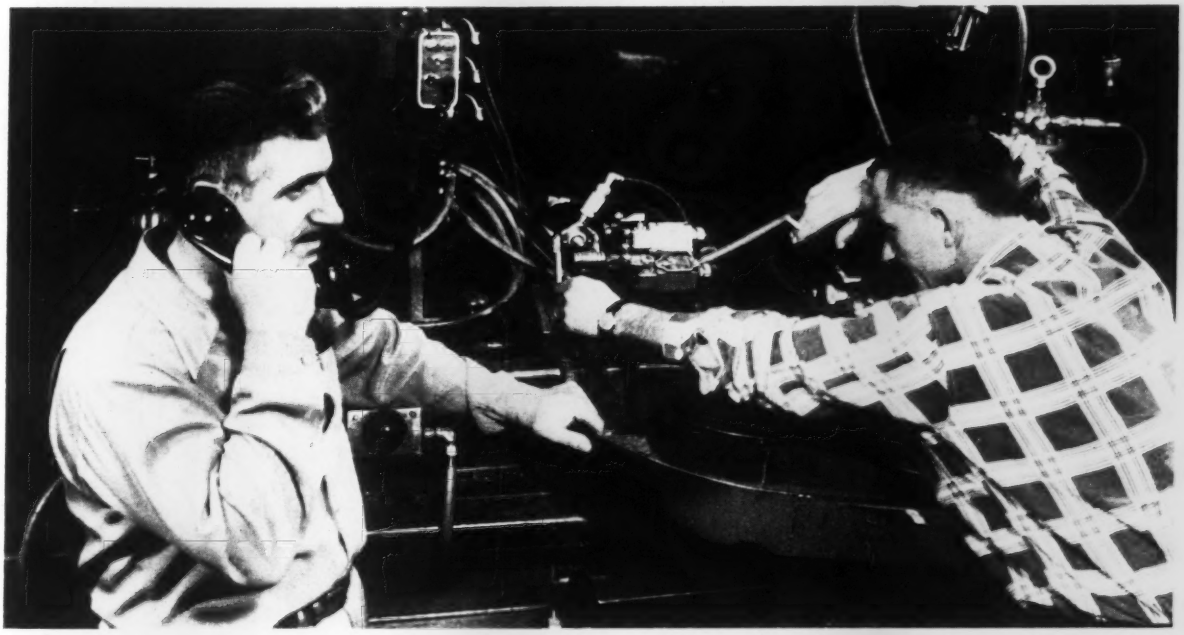
Parts—Two supervisors work in a central dispatchroom which contains a monitor and one control cabinet for every 20 machines. Each machine has a control box with red and green lights, reset button, lock, and telephone jack. Lights are duplicated on the control cabinet in the dispatchroom.

During normal operation, the green lights are on. When the operator needs more parts, or help from a foreman or maintenance man, he pushes the alarm switch which turns on a flashing red light on his box and in the controlroom. The supervisors tell the foreman the machine number through a plant-wide loudspeaker system.

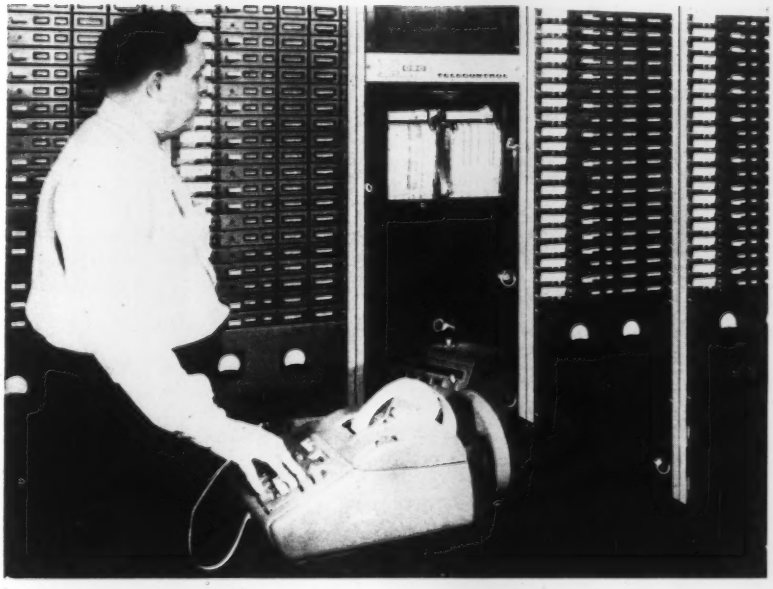
The foreman goes directly to the machine to diagnose the trouble. He plugs his phone into the box and relays the information to the dispatchroom. The supervisor directs help to the proper machine.

Automatic Timekeeper—Operator pay rates are slightly higher when machines are producing, so each control box has a switch (controlled by the foreman's key) to indicate to the control panels whether the machine is productive.

Downtime registers on the control panels. Operators are moved to productive machines if repairs take too long.



Foreman diagnoses trouble, plugs in his phone, and tells dispatcher what action is necessary to correct: More stock, repairman, tools . . .



Production facts are tallied at the end of each shift and forwarded to accounting: Number of pieces made, total downtime, number of pieces left in order

Control Cabinet — Each control cabinet has four registers (like speedometers). They show productive time elapsed, downtime, parts produced, and balance of order. When the foreman turns his key on the machine control box, productive time elapsed is stopped, downtime starts, and a red light glows steadily.

When an order is completed, the green light flashes and a "beeper" sounds, warning the supervisor to signal the machine operator to stop his machine.

At the end of each shift, supervisors transfer all production data to a five-channel tape for accounting, planning, purchasing, production, and engineering departments.

Regulation—The whole thing is controlled by a master time clock. Operators can't start the day's production until the system is turned on.

At the start of a shift, the supervisors determine what will be made. They assign jobs to each machine and set the control panels.

Foremen assign operators to the machines. To start, operator inserts a plug in the control box. As soon as his control box lights up green, he begins production.

Other Benefits — Accounting information is said to be more accurate and greatly simplified because it comes from one source.

New production jobs are more easily checked. Management merely visits the controlroom to check job progress. Prototype parts used to be walked through to iron out production bugs.

Costs — Hancock Mfg. says the system runs about $250 per machine (it has about 200). Costs are proportionately greater for fewer, less for more machines.

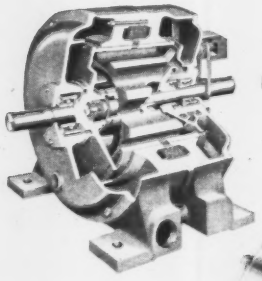
Telecontrols are made by Control Systems Co., a division of Hancock Industries, Jackson, Mich.

When You See this Nameplate— You Know Someone Has Solved a Problem!

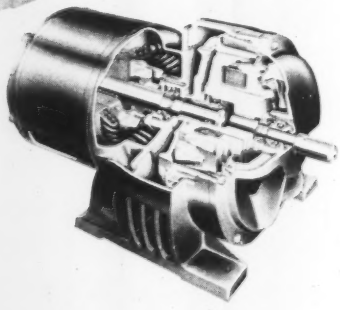
Your problem may be in the field of speed control, tension control, power transmission, or testing. Dynamatic Eddy-Current Equipment—couplings, brakes, drives, dynamometers—is solving these problems in virtually every industry, in both plant equipment and end products. It can do the same for you.

Dynamatic units offer the important advantages of rapid response, wide speed range, quiet operation, low power loss, low maintenance costs, and stepless adjustable speeds from an AC power source.

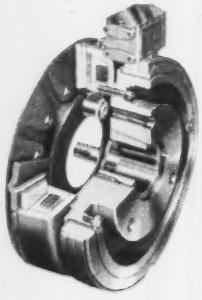
And Eaton Dyna-torQ magnetic-friction industrial clutches and brakes are solving driving and braking problems in all industries where accurate start-and-stop control is required. Check with the Eaton Dynamatic representative or distributor in your locality, or—



DYNAMATIC EDDY-CURRENT COUPLINGS AND BRAKES



DYNAMATIC AJUSTO-SPEED® AND DYNA-SPEED® DRIVES



DYNA-TORQ MAGNETIC-FRICTION CLUTCHES, BRAKES, CLUTCH-BRAKES, CLUTCH-COUPLINGS

Send for Illustrated Descriptive Literature
Covering Dynamatic Eddy-Current and Dyna-torQ Equipment

EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

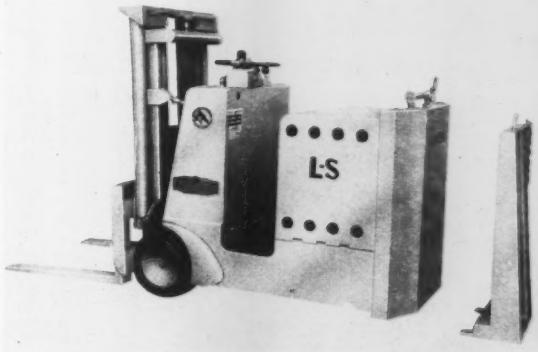
Removable Counterweight Doubles Fork Truck Capacity

Model E Multi-Master truck has a capacity of 2000 lb at a 48-in. load length. By adding a counterweight, its capacity is doubled to 4000 lb at a 48-in. load length.

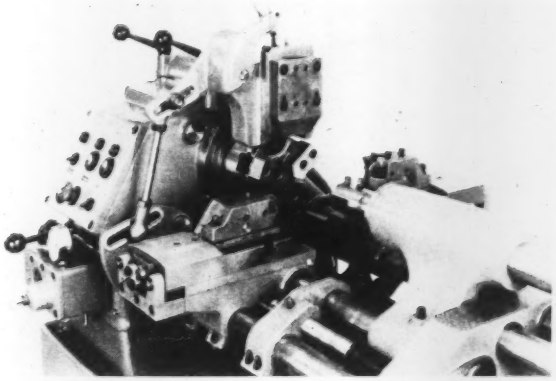
A stand for the counterweight is included as standard equipment with all trucks.

To remove the counterweight, the operator has only to back his truck against the stand and loosen two bolts. The counterweight drops into the stand. To add the counterweight, the process is reversed. The operation takes less than 2 minutes.

Without the counterweight, the truck can operate on low-capacity floors or in truck bodies. *Write*: Dept. R8-8, Lewis-Shepard Products Inc., 125 Walnut St., Watertown, Mass. *Phone*: Watertown 4-5400



Chucker Rigidly Constructed To Insure Accuracy



Traub Model AF 130, a new single spindle chucker, is the latest addition to the Traub line of automatics. This unit features an air chuck with over 5 in. capacity. Its rigid cross slides can be moved longitudinally, independently. It has a maximum turning length of 5½ in.

Extreme rigidity of construction is provided to insure highest precision and accuracy. The spindle brake is equipped with an electromagnetic clutch and ample, easily accessible chip room is provided in the base. The unit is recommended for secondary operations such as turning, facing, boring, and forming of all types of metal parts. *Write*: Guthery Machine Tool Corp., 38-31 Crescent St., Long Island City 1, N. Y. *Phone*: Exeter 2-4090

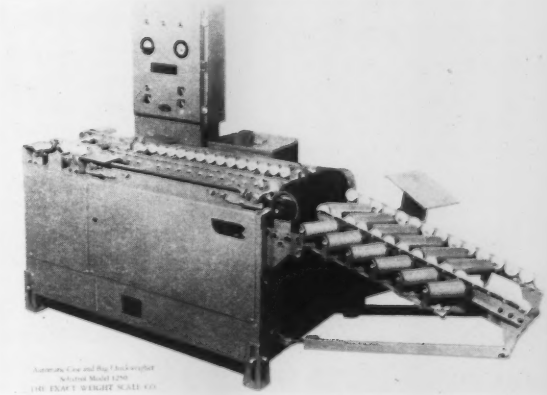
Automatic Weigher Sorts and Marks, Bags or Boxes

Selectrol Model 1250 weighs cases, cartons, and bags from 20 to 100 lb. It will handle up to 30 units a minute. Speeds and accuracy limits can be controlled, depending on production rate, product dimension, and accuracy (within 0.1 per cent is possible) required.

The unit may be supplied with underweight rejection only or underweight and overweight rejection through the same reject channel.

The machine has adjustable read-out printing equipment for marking weight discrepancies and will total a predetermined number of weighings.

Operating voltage is 115. Air pressure of 60 to 150 psi is required. Compressed air operates the rejector mechanism. *Write*: Exact Weight Scale Co., 538 E. Town St., Columbus 15, Ohio.



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YOU NEED . . .

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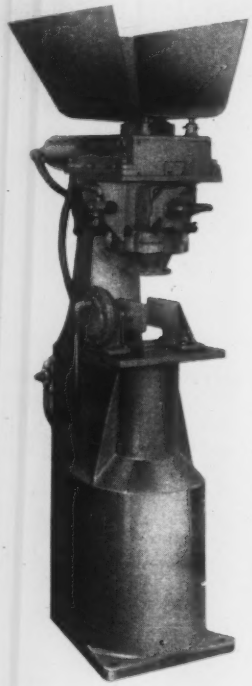
STEEL
The Metalworking Weekly

NEW PRODUCTS and equipment

Cores Blown in 2 Seconds

This single-station core blower (No. 906) is for use in semiproduction or the jobbing foundry. It is compact and produces high quality cores fast at low cost.



A choice of blowheads is available for the unit. The stationary head eliminates shifting or indexing while the reservoir is being filled. The machine table is operated hydraulically. *Write*: Machine Div., Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio. *Phone*: Endicott 1-1900

Press Has Large Die Area

The open back, inclinable, Rousselle 4B is a 40 ton, double crank, punch press. The ram is guided by the ways and the crankshaft, assuring accurate operation under unbalanced load conditions.

The unit has an electrically controlled, air operated, friction clutch. It features plug-in controls for foot or two-hand operation. A switch changes the press from single to continuous stroke and a jog button aids in setting dies. Air consumption is low.

The bed area is 16 by 48 in. and the face of the ram is 14 by 36 in. Die space is 12 in. and clearance between housings is 36 in. *Write*: Service Machine Co., 2310 W. 78th St. Chicago 20, Ill. *Phone*: Elizabeth 3-5088

Buffing Compound

All nonferrous metals can be buffed with 58-L liquid tripoli. It is particularly good for diecastings, copper plate, brass, and aluminum. *Write*: Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich. *Phone*: Tashmoo 5-0725

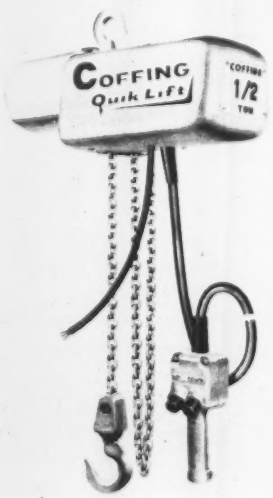
Pig Deoxidizes Steel

This "special deoxidizing pig" (weight: 6 lb) is particularly suited for applications requiring a minimum of heavy metal impurities. It contains a minimum aluminum content of 98 per cent with about 1.5 to 2 per cent iron. *Write*: Kaiser Aluminum & Chemical Sales Inc., 919 N. Michigan Ave., Chicago 11, Ill. *Phone*: Mohawk 4-6900

Portable Electric Hoists

These units have capacities of 1/4 to 2 tons and feature mechanically interlocked pushbutton controls. The plastic control station has a pistol grip. This enables the operator to pull a trolley-mounted hoist and depress the buttons with his thumb at the same time.

The unit is of sectional aluminum construction. It has a self-adjusting magnetic brake and sealed-in life-



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A LOW COST TOOL TO INCREASE

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- *Profit Margins*

Testing is an opportunity frequently overlooked. Not final testing that scraps *finished* parts . . . but testing that spots defects at the earliest possible moment before a lot of unnecessary money is spent machining pieces aimed for the scrap-pile.

Such testing is a new tool that offers immediate savings and future savings as well.

At a cost of only a few hundred dollars, many plants (large and small) now save thousands of dollars per month.

Magnaflux provides these tools. Effective, low-cost test methods eliminate wasted production effort and permit holding consistent quality standards at any level you establish. These benefits provide a higher profit percentage. Or, if you prefer, a better product at a lower price.

Can you afford to overlook these benefits? Write today for a free copy of "Lower Manufacturing Costs," an informative booklet. Or, ask our Field Engineer to discuss where and how low-cost Magnaflux Test Systems have helped others increase plant productivity.

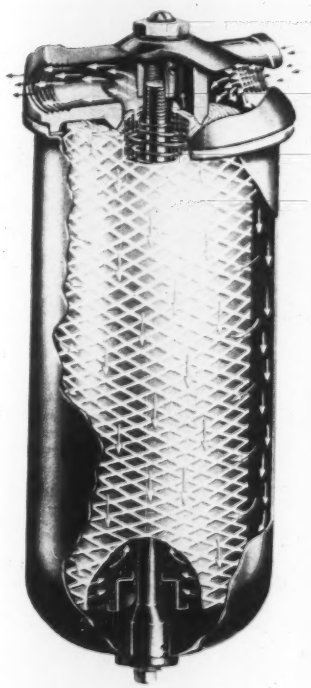
The Hallmark of *Quality* in nondestructive test systems

MAGNAFLUX CORPORATION • 7312 W. Lawrence Avenue, Chicago 31, Illinois

time lubrication. The motor is designed to reject overloads. *Write*: Coffing Hoist Div., Duff-Norton Co., Danville, Ill. *Phone*: 6-3800

Resists Chemical Attack

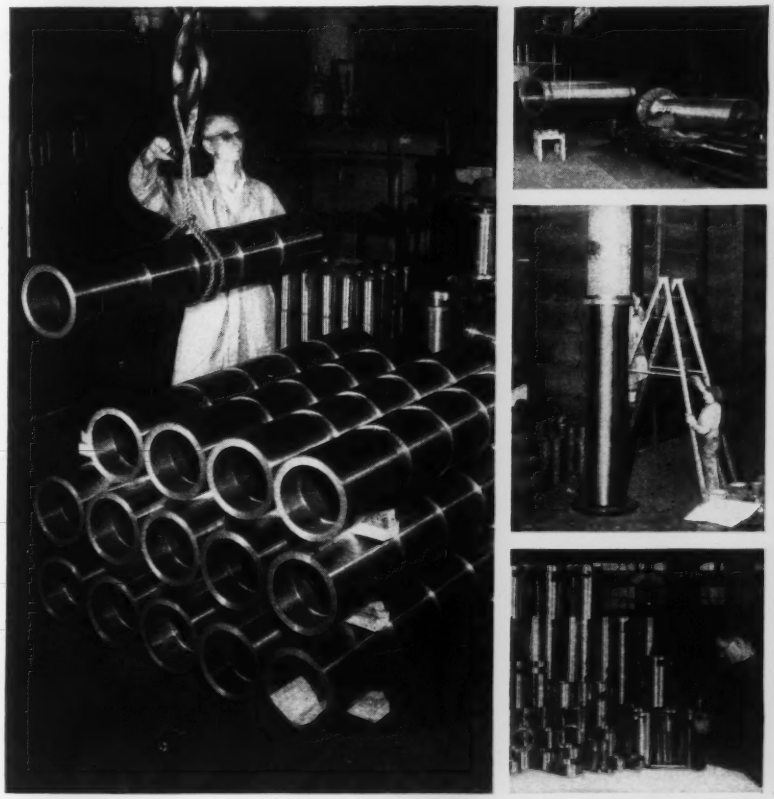
The SSB10 filter provides microclarity of liquids and gases at operating pressures up to 150 psi. Flow rate is 2½ to 5 gpm for liquids of aqueous viscosity. Air vent and drain plug are included.



The unit employs filter tubes in a variety of synthetic fibers to resist chemical solutions. Nylon, Orlon, Dacron, Dynel, Acetate, and glass fibers in a wide range of controlled densities are stocked. *Write*: Commercial Filters Corp., 2 Main St., Melrose, Mass. *Phone*: Malden 4-7000

Automatic Oiling

Type E solenoid-operated lubricator services up to 20 average bearings. A 3 or 6 pint reservoir may be used. With a larger reservoir, automatic warning systems are provided. One of these sets off a visible or audible alarm when the oil supply is low. Another auto-



You save 5 ways with

SHENANGO CENTRIFUGAL CASTINGS

By using Shenango centrifugal castings for essentially symmetrical parts, you will gain considerable savings because:

1. **The Shenango process automatically eliminates hidden defects in the metal . . . insures fewer rejects.**
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4. **With Shenango centrifugal method control, there's less excess metal to be machined away, less metal to buy and ship!**
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Check with Shenango on centrifugally cast parts for your needs —large or small castings . . . rough, semi-finished or precision-machined . . . ferrous or non-ferrous. They'll cost you less in the long run. For bulletins, write to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

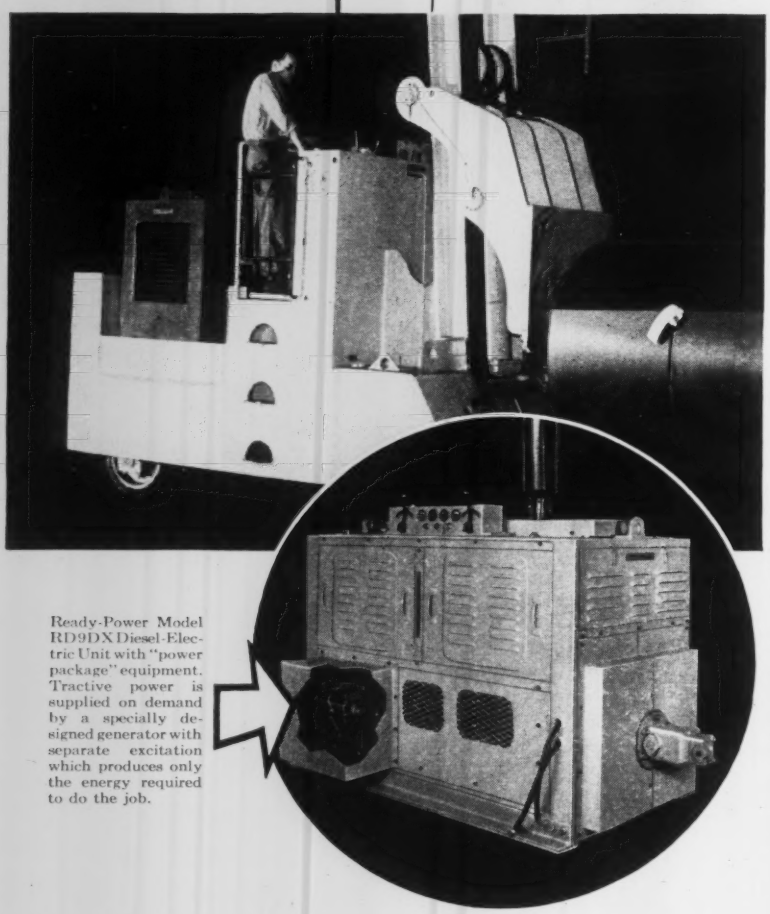
SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE* METAL • ALLOY IRONS

New Diesel-Electric "Power-Package" Does Both Jobs Economically

1 GENERATES TRUCK MOTIVE POWER

2 DIRECT-DRIVES HYDRAULIC PUMP



Ready-Power Model RD9DX Diesel-Electric Unit with "power package" equipment. Tractive power is supplied on demand by a specially designed generator with separate excitation which produces only the energy required to do the job.

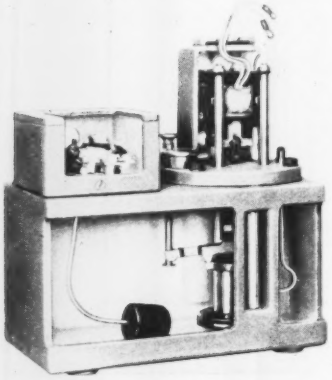
Ready-Power makes diesel-electric power doubly effective with a newly developed "power package" designed specifically for use with its "RD" Series Power Units. This remarkable new concept allows the unit to operate at *constant speed*, no load to full load, yet supplies full range of tractive power on demand and produces continuous hydraulic power without need for intermediate electric motors. The last word in simplicity, this new "power package" eliminates contactor failure, minimizes maintenance, assures maximum operating economy for electric trucks up to 200,000 lb. capacities. Write for complete information.

READY-POWER

The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electic Power Units for Industrial Trucks

NEW PRODUCTS and equipment

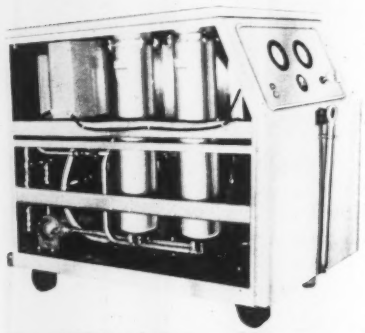


matically shuts down the machine if oil is not added within a short time after warning is given.

The solenoid is adaptable to three types of controls: Manual, integrated automatic, and remote automatic. *Write*: Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J. *Phone*: Diamond 2-8850

Filters

Filtration down to 2 microns for removal of solid contaminants down to 0.30 mg per 100 cc of fluid is claimed for this new filter line. This company furnishes filtration

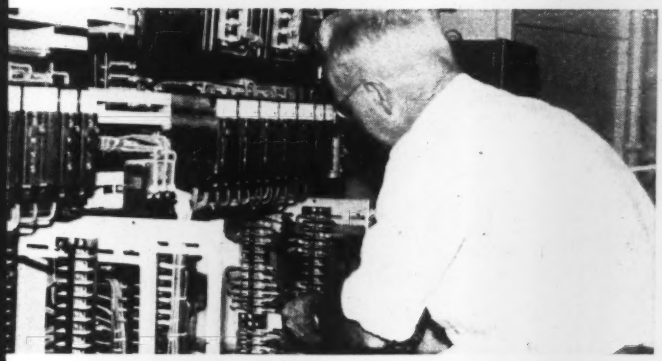


units for aircraft, industrial, automotive and truck, marine, agricultural, and construction fields. *Write*: Engine Life Products Corp., 115 S. Granada Ave., El Monte, Calif. *Phone*: Gilbert 8-6149

Fork Trucks

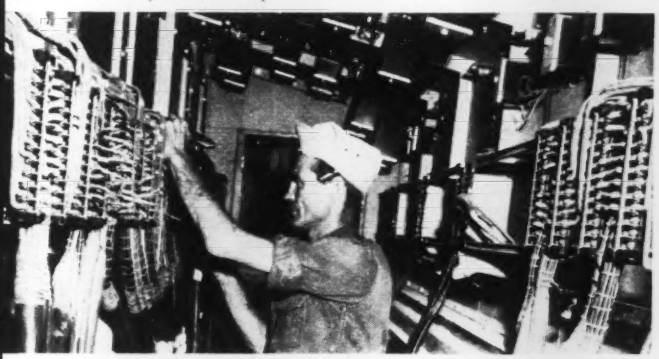
This line of three-wheel, gas powered fork trucks features the patented "Wear-Proof" clutch. It

Match the conditions in your plant with these Anaconda Control Cables

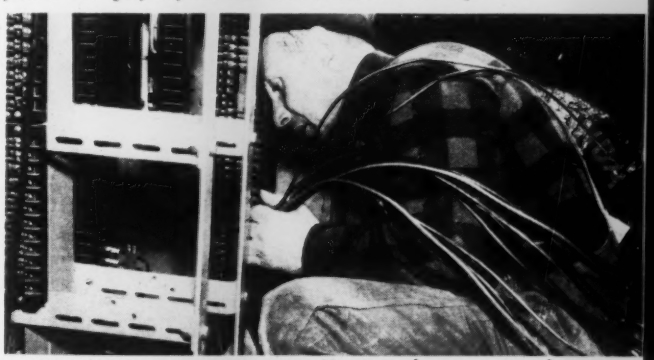


ANACONDA TYPE ANW-RUBBER-INSULATED CONTROL CABLE. Peak reliability, outstanding heat resistance. Cable is also highly resistant to moisture, acids, alkalies, other chemicals. Unusual overload capacity and long-aging characteristics. Individual conductor covering and over-all jacket of neoprene.

ANACONDA THERMOPLASTIC CONTROL CABLE. Multiple-use: aerially, in conduit, underground in ducts, direct burial in earth. Available with polyethylene (600 or 1000 volts) or Densheath* vinyl resin (600 volts) insulation and Densheath over-all jacket. Densheath jackets over polyethylene-insulated conductors on request.



ANACONDA BUTYL-INSULATED CONTROL CABLE. Ozone-resistant control cable. Individual conductor covering and over-all jacket of neoprene provide maximum insurance against moisture, mechanical injury. High-quality product with outstanding performance record.



ANACONDA TYPE PND CONTROL CABLE. For general-purpose use where space is limited. Allows installation of a 12-conductor cable in conduit carrying a 6 or 7. Individual conductor covering of abrasion-, oil-, gasoline-resistant nylon. Over-all Densheath jacket.

APPLICATION CHART FOR ANACONDA CONTROL CABLE

TYPE AND VOLTAGE RATING	CHARACTERISTICS	GENERAL APPLICATIONS	INSTALLATION METHODS
RUBBER—Insulated Control Cables			
Rubber-Insulated 600-Volts	Excellent moisture, heat resistance. Long-aging.	General-purpose and station control requirements.	Installed aerially, in conduit, underground in ducts—or buried directly in earth.
Ozone-Resistant Rubber—Insulated 600-Volts	Ozone-resistant. Proved moisture resistance, heat stability. Long-aging.		
THERMOPLASTIC—Insulated Control Cables			
Polyethylene-Insulated 600-Volts	Excellent moisture and chemical resistance. Highly resistant to electroendosmosis. Long-lived.	General-purpose control requirements.	Installed aerially, in conduit, underground in ducts—or buried directly in earth.
DENSHEATH*-Insulated 600-Volts	Thermoplastic cable. Excellent moisture and chemical resistance. Long-aging.		
Anaconda Type PND* Polyethylene-Insulated-Nylon Conductor Cover 600-Volts**	Dependable chemical and abrasion resistance. Small diameter. Long-aging.	General-purpose control requirements where space is a limiting factor.	Installed aerially, in conduit or underground in ducts.
Polyethylene-Insulated 1000-Volts	Peak moisture and chemical resistance. Heavy insulation thickness. Long-aging.	Station control requirements.	Installed aerially, in conduit, underground in ducts—or buried directly in earth.

**IPCEA voltage rating is 300 volts.
*Trademark.
Lead sheaths furnished on rubber-insulated control cables if requested.
Interlocked armor available for all types of control cable.

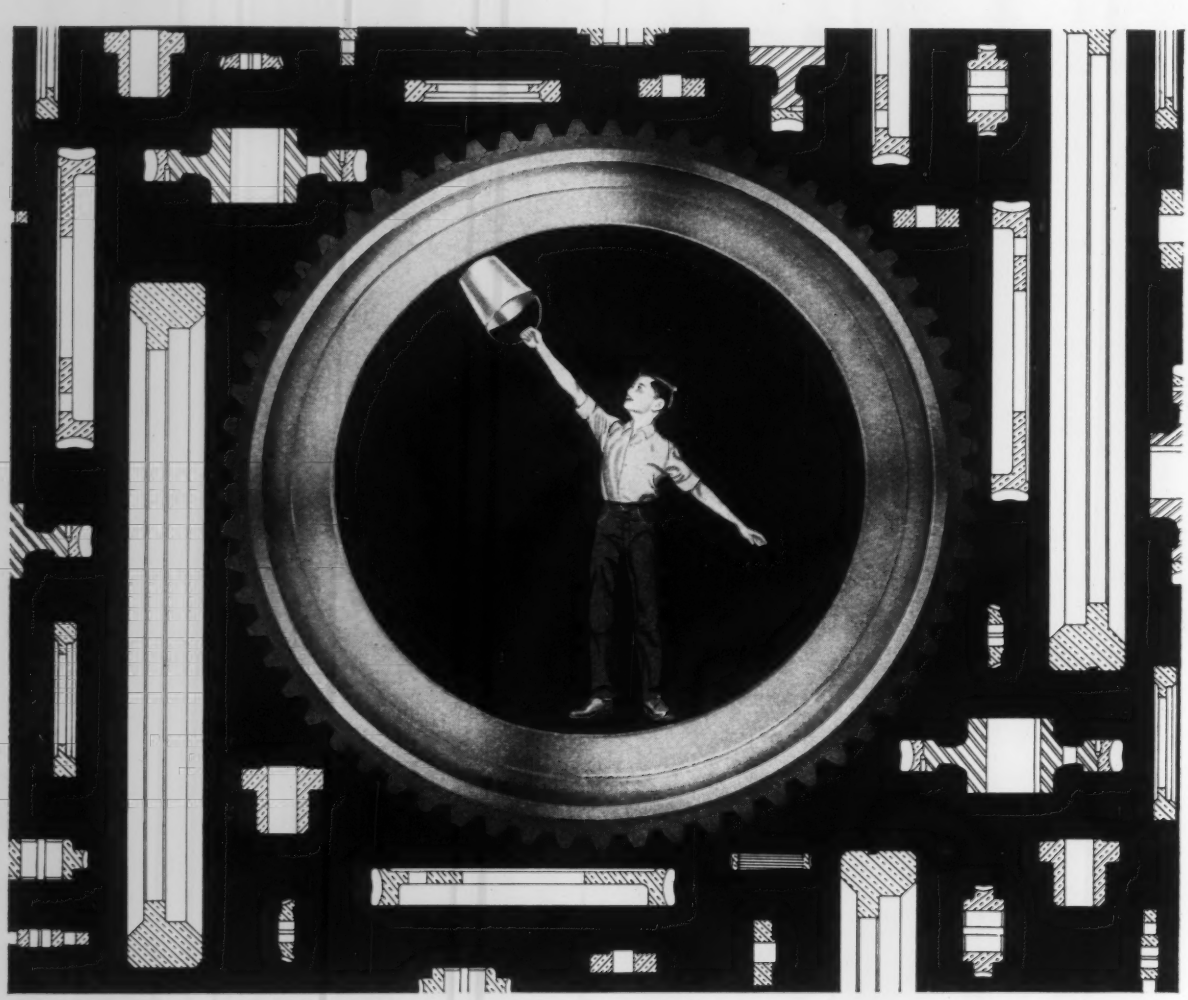
For full facts on any of Anaconda's complete line of control cables – including cables engineered for more specialized control requirements – see your Anaconda distributor or the Man from Anaconda. A comprehensive technical booklet on Anaconda Control Cables is yours for the asking. Write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N.Y.

B-5340

LIVE BETTER ELECTRICALLY

SEE THE MAN FROM **ANACONDA®**
FOR **CONTROL CABLE**

*Reg. U.S. Pat. Off.



Centrifugally cast gear blanks...in BRONZE ...are stronger, last longer!

Big gears and intricate shapes — our specialty!

We cast many blanks centrifugally . . . in sizes up to and even beyond 72″ in diameter. Because centrifugally cast gears have proved their added strength, toughness and long-wearing characteristics for many problem applications.

Laboratory testing and field experience show that physical and mechanical properties of centrifugal castings are as much as 10-15% better than those of most static castings.

But whatever the shape or size of the gear blank NBD can cast it for you (centrifugally or statically) in gear bronze, aluminum bronze, manganese bronze —to your specifications. Want iron or steel hubs cast in? We can do it. Want castings furnished rough, rough machined, or finished machined? Want sand castings, shell moldings, chilled rim or chilled three sides? You name it.

Take advantage of NBD's experience. Three strategically located plants are available to give you fast service. Call or write for quotes or information.

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

717 Grant Building, Pittsburgh 19, Pennsylvania

PLANTS IN: CHICAGO, ST. LOUIS, MEADVILLE, PA.

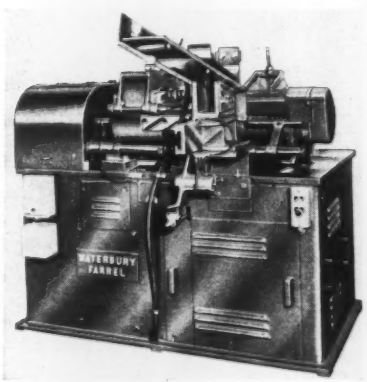
consists of a 3 to 1 gear reduction, giving operation at one-third conventional speeds. Horizontally mounted clutch and power train design allows independent replacement of parts.

The five basic models, in capacities of 1500 to 3000 lb, have hydraulic brakes, a four-point lubrication system, and planetary 27 to 1 steering ratio. *Write*: Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill. *Phone*: Spaulding 2-9300

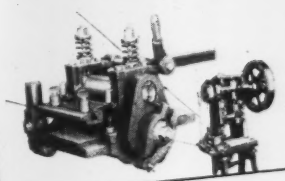
Thread Rolling

This medium screw cap machine with semiautomatic feed threads shells from 7/16 in. diameter x 5/8 in. length up to 4½ in. diameter x 4 in. length. With the feed arrangement removed, long tubes can be hand fed and threaded. A sliding key clutch makes it possible to run continuously on semiautomatic feed or on one cycle, hand feed operation.

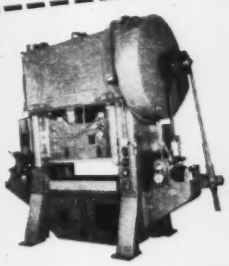
Featured is a swinging tailstock



LITTELL ROLL FEEDS



LITTELL STYLE M FEEDS
6 sizes for single automatic feeding to standard presses. Feed stock up to .055" x 8", left to right or right to left. Feed length ranges, 0-2" through 0-4⅜" with plain gears and 0-4½" through 0-8½" with compound gears. Built for years of high speed, low cost automation feeding.



LITTELL STANDARD RACK AND PINION FEEDS
No. 6-12½ Littell Double Rack and Pinion Roll Feed mounted on brackets on right and left side of Straight Sided Press. Equipped with eccentric roll lifters. Littell Feeds to fit OBI presses are also available. Accessories such as oilers, straighteners and scrap cutters supplied at additional cost. Get catalog information.

AUTOMATE
YOUR PRESENT PRESSES FOR UP TO 5 TIMES MORE OUTPUT

Want more output from your present presses? Equipped with Littell Roll Feeds those presses will punch out two to five times more stampings per hour. These Littell Feeds are pre-engineered to fit standard OBI or Straight Sided Presses and they come ready to install. Delivery is fast, installation simple. Your investment comes back in a hurry through the increased output, lower stamping costs, operator safety and lower insurance rates.

GOOD DELIVERY

Enlarged plant, new equipment to speed delivery.

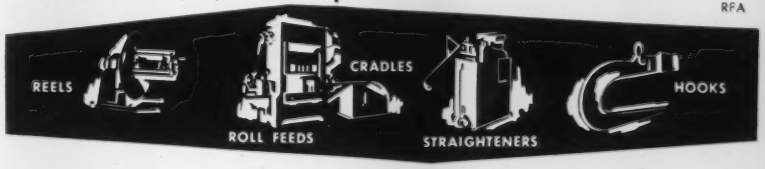
SEE OUR CATALOG IN SWEET'S

USE COUPON
to get full facts on Littell Feeds.

F. J. LITTELL MACHINE CO.
4189 N. Ravenswood Ave.
Chicago 13, Illinois
District Offices: Detroit, Cleveland

F. J. Littell Machine Co., 4189 N. Ravenswood, Chicago 13, Ill.
Send Catalog Sections "A" Describing Littell Roll Feeds.

NAME
COMPANY
STREET
CITY ZONE STATE
RFA



STEEL

. . . precision instrument gears

new Barber-Colman hobber guaranteed to index accurately within 20 seconds of arc

Barber-Colman engineers have developed a new hobbing machine which guarantees indexing accuracy suited to gears used for aircraft, missile and radar guidance systems. This machine is known as the No. 2½ - 4 hobbing machine and hobs precision spur gears up to 2½" diameter x 4" length, 30 D.P. in steel and 20 D.P. in brass. It provides accuracy, capacity and rigidity for precision fine-pitch work within a nominal price range.

One of the most important features of the new No. 2½ - 4 hobbing machine is the accuracy of relative rotation between the work spindle and the hob spindle which is guaranteed within 20 seconds of arc. This means that the spacing error on the gear caused by the indexing error of the machine would not exceed .00014" on a 2½" diameter gear.

The machine has a capacity for using 3" diameter hobs providing for a greater number of flutes to produce smooth gear tooth profiles. Using proper care in rigid tooling, accurate blanks, mounting of hob and work, and Class AA hobs with accurate sharpening, precision gears to Class 3 tolerances are hobbed with this machine.

Several design features are a departure from standard hobbing machine construction. There is no hob slide — only a hob carriage for conventional feed. In place of a hob slide, the hob arbor is mounted on a swivel which adjusts to compensate for hob thread angle. The work slide is stationary, and the hob swivel raises and lowers to meet diameter requirements. The machine has no overarm support, permitting greater work visibility and operator access. Both work and hob spindles are mounted in precision anti-friction bearings to provide accurate rotation at high speeds. The hob carriage also has anti-friction way supports, and the metal-to-metal contact afforded provides more rigidity than obtained with gib-type mounting. An infinite number of hob speeds are provided without change gears in the range of 200 to 1200 r.p.m.

Rigidly constructed, with a steel weldment base and heavy grey iron machine bed, the machine is designed with a minimum number of parts at points where deflection and inaccuracies may occur. Net machine weight without tooling is approximately 1500 lbs. Standard equipment includes motor and controls and one set of change gears.

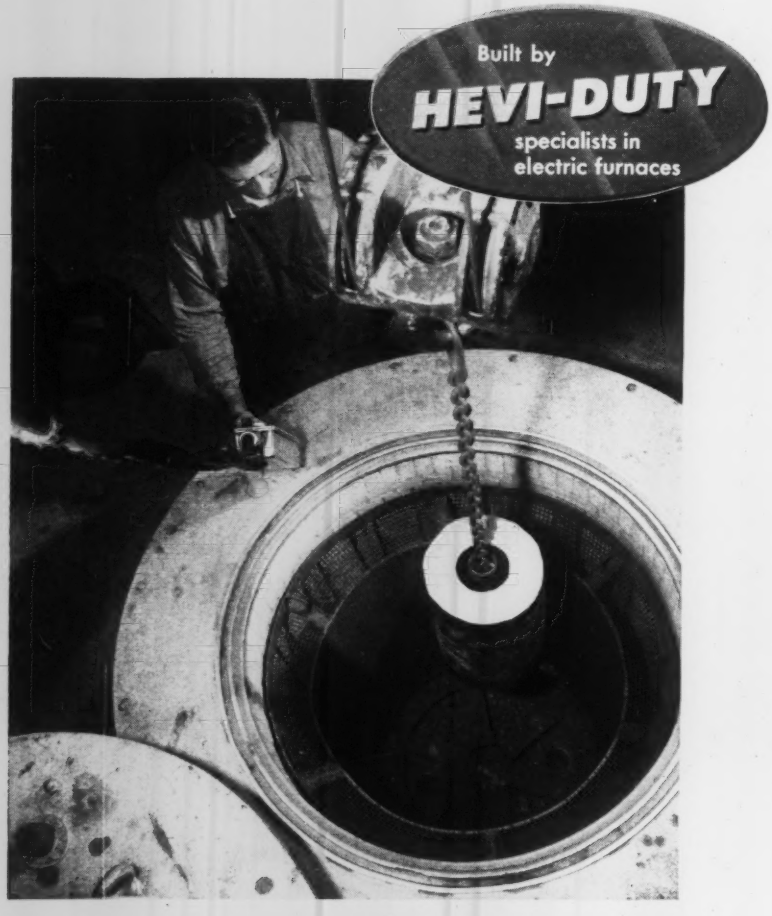
For complete specifications and data contact your nearest Barber-Colman representative, or write directly to the factory for a copy of new bulletin F-8642. Orders are now being booked for July and August deliveries.

BARBER-COLMAN COMPANY

734 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

BARBER COLMAN



Allegheny Ludlum Chose This Pit Furnace ...for top-to-bottom temperature uniformity

Allegheny Ludlum Corporation, Los Angeles, uses this electric pit-type furnace to obtain uniform hardness along the entire length of 42-inch extruding liners and rams. Uniformity over so great an area calls for unusually good furnace performance. That's why they chose a Hevi-Duty furnace.

A temperature check, made at 18 different stations within the furnace, soon confirmed the wisdom of their choice. It revealed a maximum temperature variation of only plus or minus 5°F. Control like this has virtually eliminated rejects and demonstrated once again that *it takes quality to make quality.*

Write for Bulletin 451 for complete details.

- Heat Processing Furnaces
- Dry Type Transformers
- Constant Current Regulators

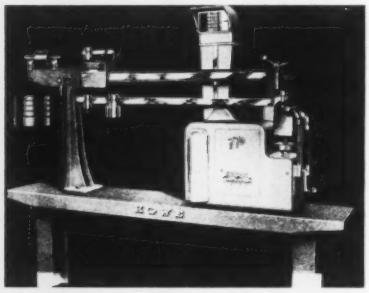
HEVI-DUTY ELECTRIC CO.
Milwaukee 1, Wisconsin

NEW PRODUCTS and equipment

which can be adjusted to compensate for axial deflection of the spindle when the work is of heavy gage or of small diameter. *Write*: Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. *Phone*: Plaza 6-3621

Weight Projection

The Weightograph projects the actual weight on a large illuminated screen in a nonprotruding, eye-level periscope housing. It is possible to read accurately indicated weight,

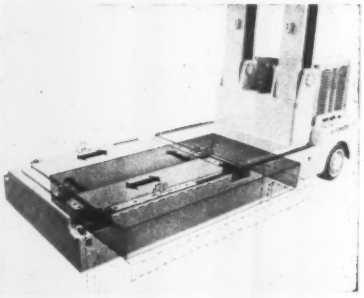


figures, and graduations many feet away from the scale. Chart, pendulum shaft, and levers operate on precision ball bearings. *Write*: Howe Scale Co., subsidiary of Safety Industries Inc., Rutland, Vt.

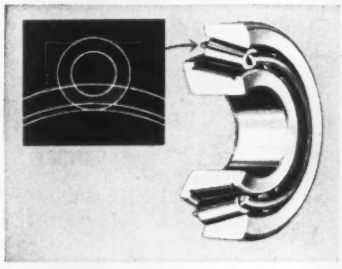
Die Handler

Model TLOH-20 incorporates both end and side loading of dies up to 40,000 lb. Hydraulically actuated hooks operate 12 in. beyond the end of the platform and have 112 in. of travel. The use of hydraulic rams with a travel speed of 8 to 10 fpm reduces loading time and shortens the truck, enabling it to maneuver in 127 in. intersecting aisles.

The bed of the platform is 27



Tomorrow's "dream" is our job today!



HIGHER FLANGE IMPROVES ROLLER ALIGNMENT

As shown by the gray area above, the higher flange provides a large two-zone contact area for the roller heads. This greatly reduces wear—practically eliminates "end play". Larger oil groove provides positive lubrication.

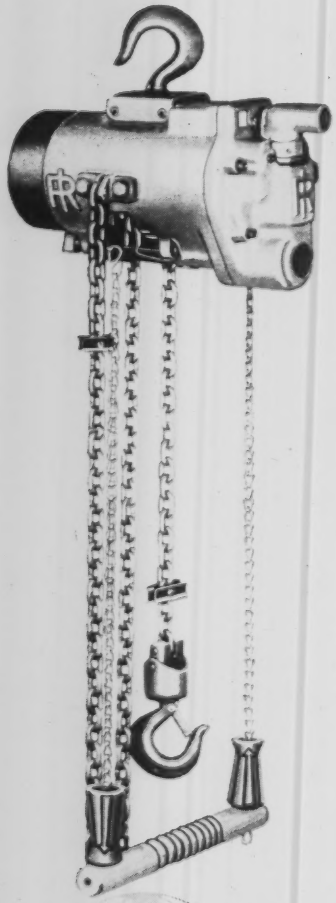
There's more to the car of tomorrow than just futuristic styling! Automotive engineers are working to perfect completely new power plants—like turbine engines—to achieve yet-unheard-of performance and economy! And they demand bearings that are as advanced as their thinking. This is no new challenge to Bower engineers. A glance at the design features listed at left will tell you a few of the many original Bower contributions to bearing performance which have reduced bearing maintenance and failure to a practical minimum. There are many more in the making. If your product is one which needs advanced bearings *today* plus realistic planning for the future, specify Bower. There's a complete line of tapered, straight and journal roller bearings for every field of transportation and industry.

BOWER ROLLER BEARING DIVISION
FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 14, MICHIGAN

SPHER HONED

BOWER ROLLER BEARINGS

LIGHT-Weight
LOW-HEAD
HOISTS



Unequalled for tough jobs, these hoists are unaffected by hot, corrosive, or wet atmospheres and are explosion and shock proof.

They are available in two capacities. The ½-ton size weighs only 39 lbs., and the 1-ton size weighs only 55 lbs. Fully-loaded lifting speeds are 40 fpm and 20 fpm respectively, and both units are available with either link or roller chain.

Ask your Ingersoll-Rand AIR-engineer to demonstrate these new "light weight leaders" in the complete line of Ingersoll-Rand air hoists from 200 lbs. to 24,000 lbs. capacity. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Send for free copy of new Lightweight Air Hoist Bulletin Form 5224.

Ingersoll-Rand

Tools plus AIRengineering increase output per man

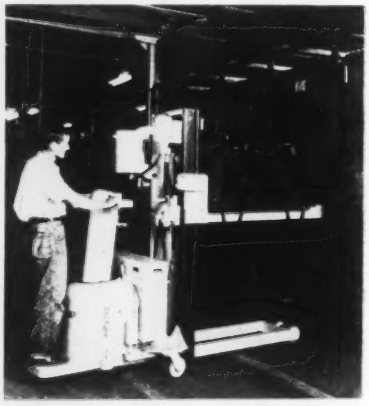
8-752

NEW PRODUCTS and equipment

in. from the floor in low position and can be raised to 62 in. Operating controls are at the right side of the truck. It has a rear guard and deadman brakes, power steering, and a speed of 3 mph loaded. *Write*: Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000

Platform Truck

PO-40 moves and stores skids, boxes, or any load that can be carried on the platform. It has a short turning radius and free steering. A nonslip platform is provided for the operator. All operations are controlled by pushbuttons.

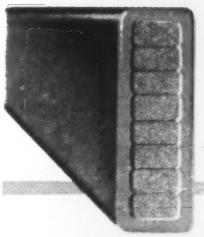


Standard units have capacities from 4000 to 6000 lb, lift of 72 in., and platform length of 30 to 60 in. Height is 82 in. The unit has two speeds forward and reverse and is available with 12 or 24 volt systems. *Write*: Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill. *Phone*: Crestwood 2-2300

Rotary Gear Shaving Aid

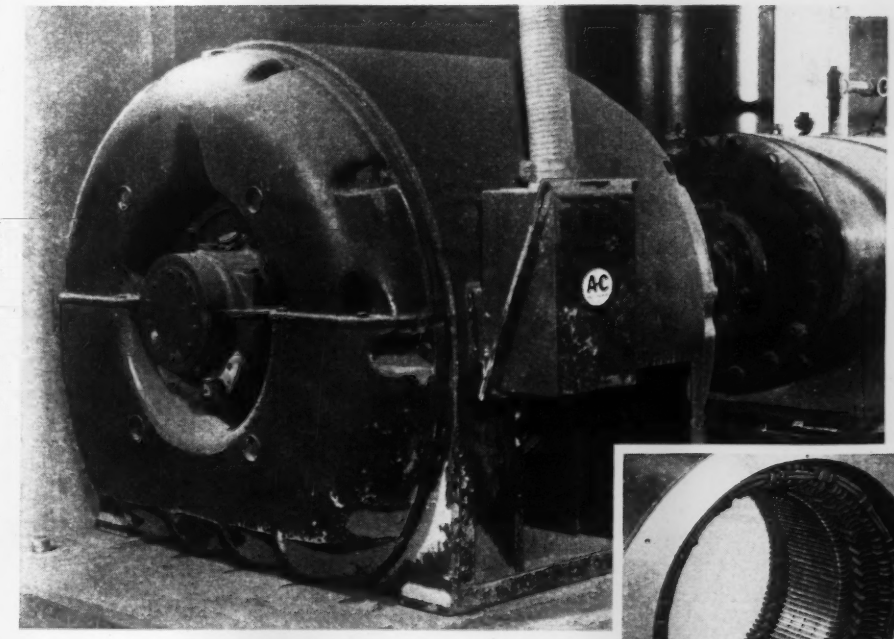
This chain load rail design simplifies the loading of heavy gears in rotary gear shaving machines. With this unit, all skidding of the gearshaft bearing or arbor surfaces, which occurs with slide rails, is eliminated. It is adaptable to a variety of gears and machines.

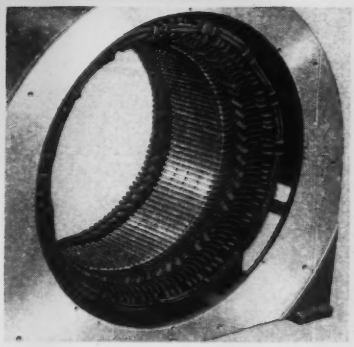
The gear is lowered onto load rails, then rolled forward to engage rollers supported by a con-



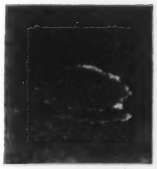
Super-Seal ...

motor with void-free insulation





The motor that dust and dirt can't hurt



Silco-Flex Insulation

Polyester Mica Tape

Asphaltum Mica Tape

Note difference in abrasion!
Insulation shown after sandblasting for one minute with 90-grit aluminum oxide and 100-psi air from distance of six inches.

REDUCE motor clean-up frequency and schedule this downtime at your convenience by using *Super-Seal* motors in areas where there's abrasive dust and clogging dirt. These motors —

Resist abrasion: Rubbery *Silco-Flex* insulation used in *Super-Seal* motors resists the cutting action of abrasive dust particles. Unlike conventional insulations, *Silco-Flex* insulation is flexible and resilient.

Completely sealed: *Super-Seal* motor insulation is sealed against contaminants. The vulcanized void-free dielectric barrier of *Silco-Flex* insulated stator coils even resists penetration by carbon black particles.

Combined with void-free *Silco-Flex* insulation are integrated mechanical features that make this motor especially suited to your toughest applications.

Get details! Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

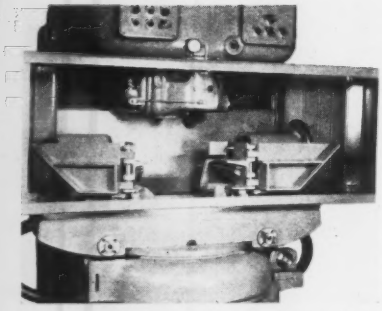
Super-Seal and *Silco-Flex* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5702

NEW PRODUCTS and equipment

ventional roller chain. The chain rollers permit freedom of straight line, back and forth movement. The five rollers attached to the chain permit free rotary motion of the gear. Thus the gear can be easily advanced or retracted while being rolled into the mesh with the shaving cutter. When the gear is in proper mesh, the tailstock center is advanced with a handwheel and the

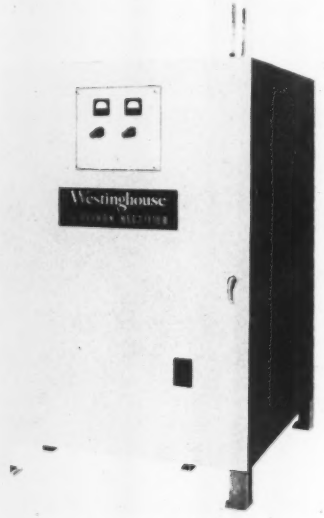


work is in position for the shaving cycle. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Silicone Rectifier

These units are provided as regulated or unregulated equipment. Complete protective equipment, transformer, and rectifier assembly are in a single enclosure. In addition, the regulated units include a saturable reactor and voltage regulator.

Rated at 100, 150, 200, and 300 kw, these rectifier assemblies operate at 94 to 95 per cent efficiency. They are protected against short circuits, overloads, element failures, and loss of cooling air. *Write*: Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. *Phone*: Express 1-2800



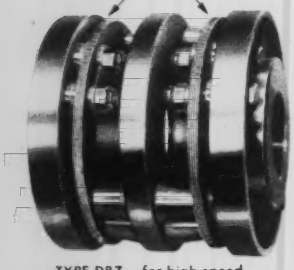
High Strength Adhesive

EC-1368 adhesive produces high strength laminates with plastic, steel, wood, aluminum, and other materials. It can be used in industrial operations, such as bonding plastic laminates to metal counter and table tops.

This product features bonds which have exceptionally high dead load shear strength, high peel strength, and excellent resistance to cold flow. It resists water and retains adhesive strength over 200° F. Bonds made between high pressure laminates and steel, aluminum, or wood have shear strengths in the range of 500 psi.

This adhesive can be applied by

"TOMALOY" FLEXIBLE DISC RINGS



TYPE DBZ — for high speed, heavy duty drives

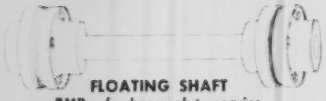
PROTECT

YOUR INVESTMENT IN PUMPS, COMPRESSORS and OTHER DRIVES BY USING

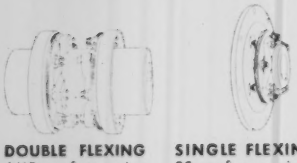
THOMAS FLEXIBLE COUPLINGS

NO LUBRICATION
NO MAINTENANCE
NO WEARING PARTS

There is a "Thomas" Coupling for every purpose.



FLOATING SHAFT
BMR — for heavy duty service with excessive misalignment



DOUBLE FLEXING
AMR — for engine and medium speed drives

SINGLE FLEXING
SS — for engine-driven generator sets with out-board bearings

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

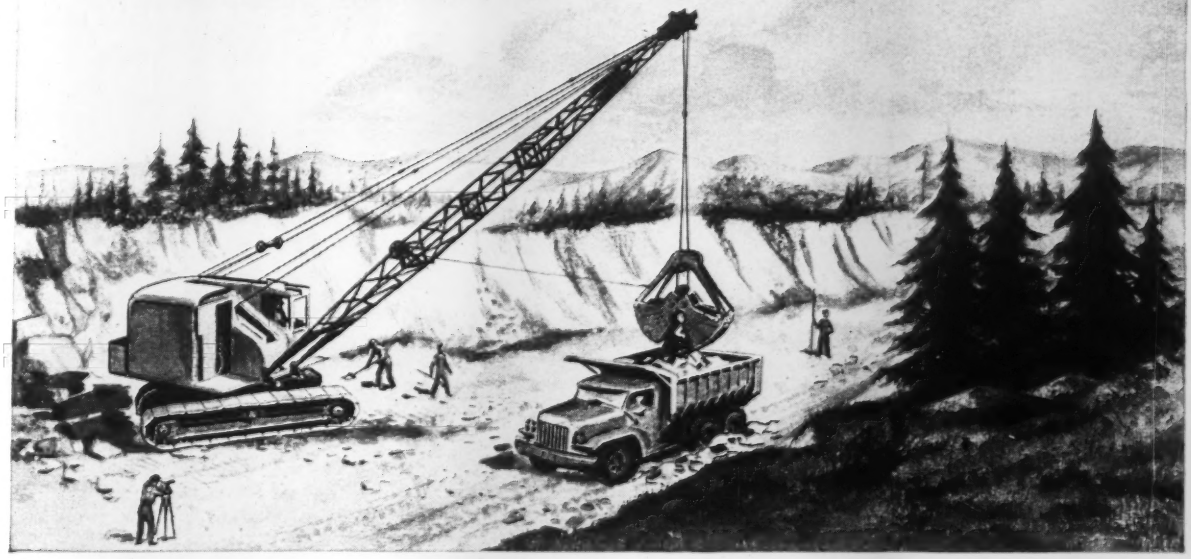
1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for engineering catalog 51A, and the name of your nearest Thomas representative

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

GEARED to move mountains of earth!

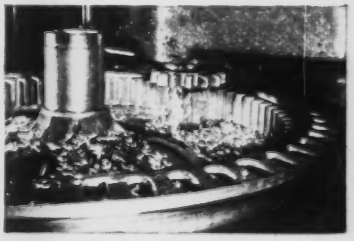


Sharp curves and steep grades used to be a part of almost any highway trip. But after the great new highway programs are completed, you will be able to travel nearly everywhere in our country with a greater degree of safety and comfort. Giant construction machines will move mountains of earth in building the sweeping scenic roads that will make up our national highway system.

Gears cut on Fellows Gear Shapers are important components of the machines that perform this herculean task. In an earthmover, for example, many tons of force must be transmitted smoothly and without failure. Often these heavy duty gears must be of large diameter and coarse pitch.* In any case, there are Fellows machines that can produce them accurately and rapidly.

Your own gear production needs, from 1/16" to 120" pitch diameter, can very likely be met more profitably and efficiently with Fellows Gear Production Equipment. For information about the complete Fellows line, write, wire, or phone any Fellows office.

*For example, Thew Shovel Company of Lorain, Ohio produces this 73 tooth, 1.8235 D.P. internal gear on a standard Fellows 100-inch Gear Shaper. Gear is used in Lorain shovels and cranes.

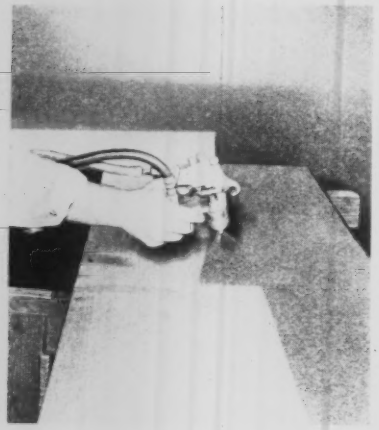


THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE

Fellows *Gear Production Equipment*

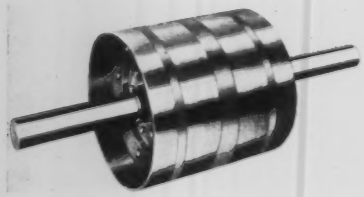
NEW PRODUCTS and equipment



brush, spray, or hand roller. Toluol, Hexane, or commercial lacquer thinners can be used for cleaning and removing excess adhesive. *Write*: Adhesives, Coatings & Sealers Div., Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich. *Phone*: Trinity 5-7111

Ceramic Magnet Pulley

Indox V ceramic permanent magnets energize this pulley, producing a magnetic field that removes tramp iron from fast moving conveyor burdens. A radial pole design boosts holding efficiency.



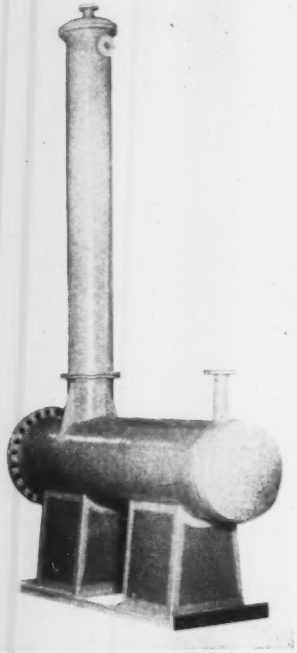
Series 410, and 710 for deeper conveyor burdens, are available in standard widths from 12 in. up, and in diameters of 12, 15, 18, 20, and 24 in. (larger sizes on request). *Write*: Stearns Magnetic Products Div., Indiana Steel Products Co., 635 S. 28th St., Milwaukee 46, Wis. *Phone*: Evergreen 3-4800

Reduces Acid Fumes

Akweons 250, acid fume depressant, reduces acid fumes in pickling and electroplating operations. It is effective with most acids, including hydrochloric and sulfuric, over a wide range of temperature and acid concentrations. It has no corrosion inhibition properties. It is also a wetting agent and has detergent properties for metals in most pH ranges. Write: Technical Products Dept., Swift & Co., 1800 165th St., Hammond, Ind.

Gas Scrubbing Towers

These Duracor reinforced plastic towers resist corrosive gas, fumes, or liquids. They provide heat resistance at temperatures up to 300° F. Duracor has tensile strengths

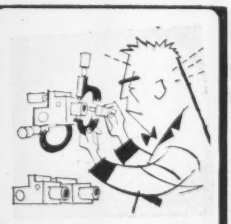


ranging from 11,000 to 15,000 psi and flexural strengths from 20,000 to 30,000 psi. *Write*: Ceilcote Co., 4922 Ridge Rd., Cleveland 9, Ohio. *Phone*: Shadyside 1-4220

Handles Odd Shapes

The tire of this turning roll is 37 in. in diameter and has a 6-in. face with a 2-in. thick forged and flame hardened ring. The small width and large diameter of the wheel provides clearance for vessels with limited roller access because of large or closely spaced projections.

Power for the weldment positioner is provided by variable speed drive accommodating up to 50-ton loads. *Write*: Positioning Equipment Sales, Worthington Corp., Plainfield, N. J. *Phone*: Plainfield 7-1200



NOW... SEE FOR YOURSELF how PRATT & WHITNEY SIGMATIC

Multi-Dimension GAGING MACHINE

REDUCES INSPECTION COSTS AND IMPROVES QUALITY CONTROL

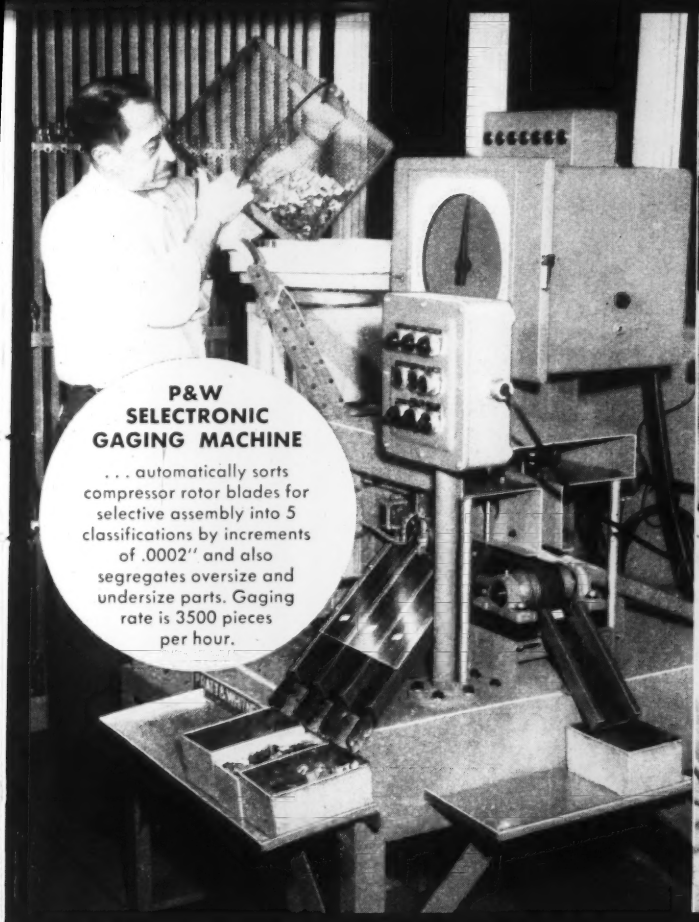
... CHECK UP TO 50 SEPARATE DIMENSIONS SIMULTANEOUSLY — at inspection rates up to 3,600 pieces per hour; with manual semi-automatic or fully automatic operation as required to meet your needs.

SEE IT ALL! IN "BREAKING THE GAGING BOTTLENECK" ... a 17-minute 16 mm sound motion picture film in full color.

To arrange a showing date for your plant, write on your company letterhead to Pratt & Whitney Company, Inc., 13 Charter Oak Blvd., West Hartford 1, Connecticut.

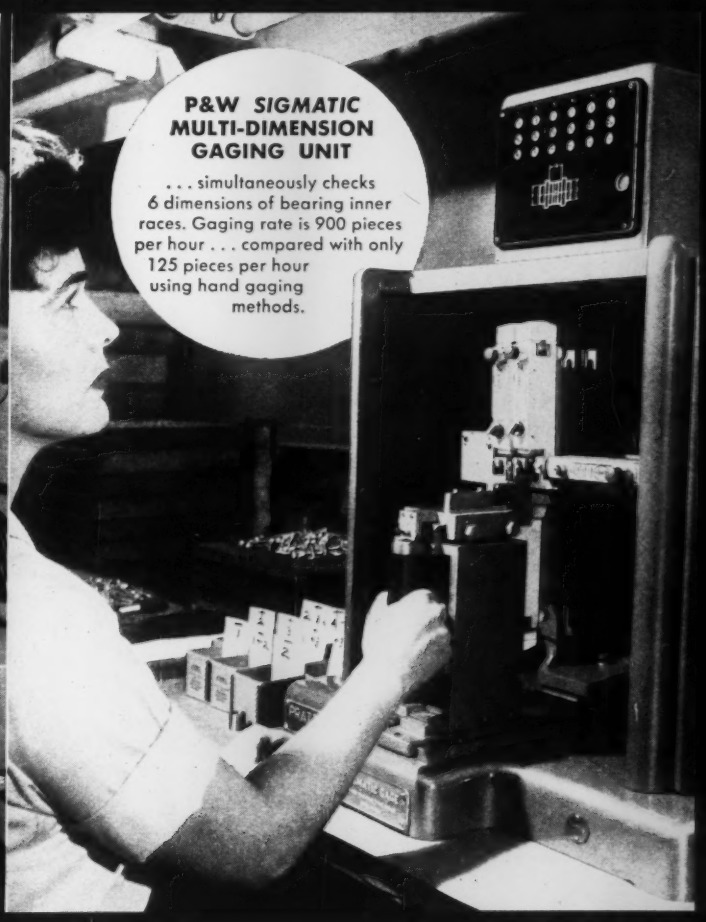
PRATT & WHITNEY
First Choice for Accuracy

MACHINE TOOLS • GAGES • CUTTING TOOLS



P&W SELECTRONIC GAGING MACHINE

. . . automatically sorts compressor rotor blades for selective assembly into 5 classifications by increments of .0002" and also segregates oversize and undersize parts. Gaging rate is 3500 pieces per hour.



P&W *SIGMATIC* MULTI-DIMENSION GAGING UNIT

. . . simultaneously checks 6 dimensions of bearing inner races. Gaging rate is 900 pieces per hour . . . compared with only 125 pieces per hour using hand gaging methods.

BREAK 100% INSPECTION BOTTLENECKS

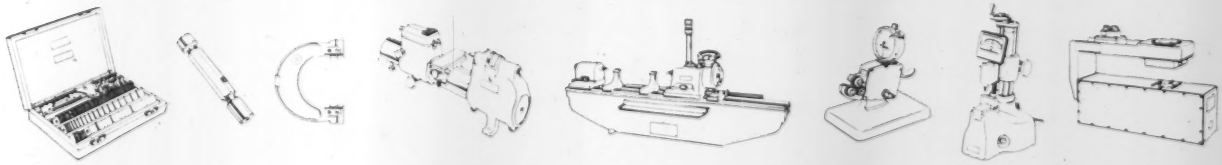
. . . WITH PRATT & WHITNEY "JOB-ENGINEERED" GAGING MACHINES

Performance levels in this space-travel era have created demands for much higher standards of precision. More and more components now require 100% inspection. In many plants, this has resulted in production bottlenecks at the inspection bench, and gaging costs have soared. Where parts must be classified for selective assembly, or where several dimensions of each part must be checked, the slow-down is intensified. Inspection costs sometimes exceed manufacturing costs.

Manufacturers are finding that Pratt & Whitney Automatic Gaging installations – like the examples above – provide the ideal solution. While each installation is job-engineered to provide the best possible gaging method, costs are kept to a minimum, because P&W Automatic Gaging Machines are assembled from standard, in-stock units. Sigmatic Gaging Machines, for example, are usually equipped with interchangeable gage tooling for fast, easy change-over from one part to another.

If the components you produce require 100% inspection, P&W Automatic Gaging can help you eliminate inspection bottlenecks and reduce gaging costs.

Send now for complete case-history reports on the 2 installations shown above and for fully descriptive product literature. Pratt & Whitney Company, Inc., 13 Charter Oak Blvd., West Hartford, Conn.



GAGE BLOCKS . . . CONVENTIONAL GAGES . . . SUPERMICROMETERS . . . STANDARD MEASURING MACHINES . . . COMPARATORS . . . AUTOMATION AND CONTINUOUS GAGES

PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

NEW literature

Write directly to the company for a copy

Couplings

This 26-page catalog describes special quick connect-quick disconnect couplings designed to function at −300 to +400° F, 575 to 3300 psi, and with proof pressures reaching 4500 psi. Snap-Tite Inc., Union City, Pa.

Machine Mount

. A 4-page folder describes a precision leveling mount for machine and tool installation and gives prices. Dept. A. L., Clark, Cutler, McDermott Co., Franklin, Mass.

Workbenches

Equiptogram 204A describes 4, 5, and 6 ft benches available with 12-gage steel, Masonite on steel, maple, or plastic bonded tops. Equipto Div., Aurora Equipment Co., Aurora, Ill.

Temperature Controls

Catalog MC-156 gives details on nine types of temperature controls for general industrial use. Fenwal Inc., Pleasant St., Ashland, Mass.

Screw Machine

This catalog describes two models of a ¾ in., single spindle, automatic screw machine. Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich.

Aluminum Chemicals

This 48-page handbook on applications of aluminum chemicals provides information on sources, major uses, products, and quality control facilities. Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

Flash Buttwelding

Bulletin 7-913 tells about this process. Forty buttwelders and their applications, types of clamping, flash and upset mechanisms are described. Taylor-Winfield Corp., Warren, Ohio.

Reference Book

MME-P, 28 pages, covers molded, extruded, and die-cut parts of rubber, synthetics, and plastics. Extrusions and die cut material meeting government specifications are listed. Miller Products Co., Inc., 29 Warren St., New York 7, N. Y.

Hand Hoists

Bulletin DH-164-C presents specifications and dimensions on hand hoists (chain) with lifting capacities from ½ to 50 tons. Wright Hoist Div., American Chain & Cable Co. Inc., York, Pa.

Induction Heating

A profit capacity analysis shows possible production economies and describes applications. Magnethermic Corp., 3990 Simon Rd., Youngstown 7, Ohio.

Precision Stamped Gears

This 20-page booklet contains examples, applications, sizes, materials, and finishes of gears. Also presented are design suggestions and basic dimensional data. Fastex Div., Illinois Tool Works, 195 Algonquin Rd., Des Plaines, Ill.

Steel Shelving

Catalog No. 30, 64 pages, describes shelves and cabinets for shop and office. Included are suggestions for correct shelving and construction of stockrooms. Deluxe Metal Furniture Co., Warren, Pa.

Demineralizers

Bulletin WC-111A describes application, principles of operation, construction, and estimated operating costs of demineralizers. Included are comparison charts, detailed layouts, and operating cycle drawings of multibed, mixed bed, and scavenger systems. Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.

Heavy Duty Flooring

Bulletin 658 explains use and application of heavy duty emery aggregates, bricks, bonds, and cures. Walter Maguire Co. Inc., 60 E. 42nd St., New York 17, N. Y.

Hydraulic Oils

Technical Bulletin B-4, 44 pages, covers principles of hydraulic systems and accessories. Oil characteristics, selection, and troubleshooting are discussed. Sun Oil Co., Philadelphia 3, Pa.

Rotary Tables

This bulletin describes rotary tables designed for most milling, drilling, and boring uses (standard and automation). W. B. Knight Machinery Co., 3920 W. Pine Blvd., St. Louis 8, Mo.

Hydraulic Line Tubing

This brochure covers resistance welded hydraulic line tubing. It tells how it can be bent, flared, and assembled. Recommended working pressures and size ranges are shown in a table. Steel & Tubes Div., Republic Steel Corp., 224 E. 131st St., Cleveland 8, Ohio.

Roof Ventilators

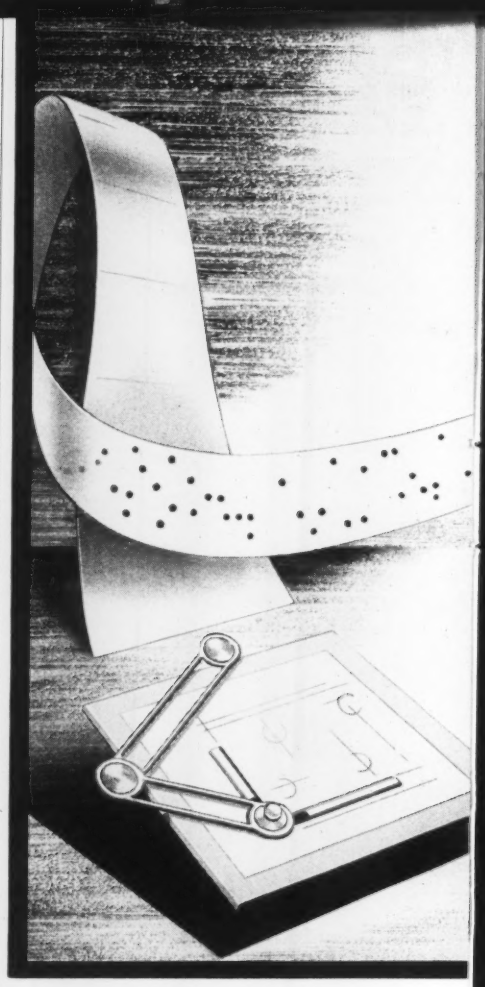
Bulletin 2700 gives capacity ratings, noise-level classifications, motor-selection specifications, installation notes, and accessory descriptions. Data on airflow capacities are included. Ilg Electric Ventilating Co., 2850 N. Pulaski Rd., Chicago 41, Ill.

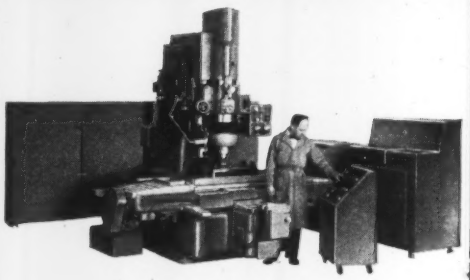
Metal Mesh Slings

This catalog includes specifications for the weight and nature of loads and sling capacities according to the hitch used. A section on computation of dimensions and weights is included. Cambridge Wire Cloth Co., Cambridge, Md.

Gun Drilling

This booklet contains diagrams and charts explaining principles, advantages, and limitations of gun drilling techniques. Included are typical heads, reamers, ma-





OTHER P&W NUMERICALLY CONTROLLED MACHINE TOOLS

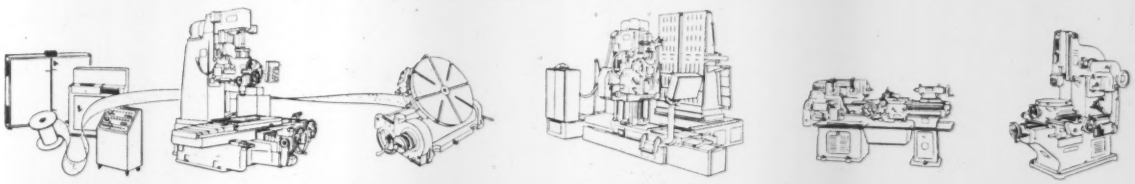
. . . include the No. 2E Vertical Precision Hole Grinder and the 42" Precision Rotary Table.

PRECISION JIG BORING TIME CUT 90% . . .

. . . **WITH P&W NUMERICAL CONTROL!** Precision work put on *predictable* production schedules, completed in as little as 1/10 the time required by previous methods. Costly human errors are eliminated. Positioning accurate to "tenths" absolutely guaranteed. These benefits are reported by Dexter Tool Company of Hazel Park, Michigan, since installing a Pratt & Whitney Numerically Controlled Jig Borer. Dexter produces precision aircraft and automotive components. Work involves 6 to 50 identically machined parts, and it's important to guarantee precision, accurately estimate production time and deliver on schedule. Positioning itself automatically by punched tape, the Numerically Controlled Jig Borer handles "tenths" limits as fast and surely as ordinary work. A Dexter spokesman states, "We think the P&W 2E Numerical is the greatest single improvement in machine tooling. It's the ultimate."

Today, "tenths" limits are common, yet profitable operation demands that you produce faster than ever before. Pratt & Whitney Machine Tools with Numerical Control can provide the right answer for you!

Write now for complete information.
Pratt & Whitney Company, Inc.
13 Charter Oak Boulevard, West Hartford, Conn.



NUMERICAL CONTROL . . . JIG BORERS . . . ROTARY TABLES . . . KELLER MACHINES . . . LATHES . . . VERTICAL SHAPERS

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chine setups, and coolant volume, pressure, and viscosity requirements. Madison Industries Inc., Muskegon, Mich.

Packaging Machine

This bulletin describes a packaging machine which feeds parts, heat seals, prints, cuts off, and counts bags automatically. Product Packaging Engineering, 5747 Marilyn Ave., Culver City, Calif.

Lift Trucks

This catalog describes a series of 3000 to 5000 lb capacity cushion-tired trucks. Operating features, construction, and serviceability of three models are analyzed. Hyster Co., 1003 Myers St., Danville, Ill.

Hydraulic Hose

Catalog 4430 describes rubber covered double wire-braided hose and re-usable fittings. Included are stainless steel braided hose and perforated cover hose. Parker Fittings & Hose Div., Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, Ohio.

Conveyors

Catalog MF-100 describes hinged steel belt conveyors for heavy industry and warehousing. Included are portable and semiportable units for handling parts and a conveyor for automatic scrap removal. May-Fran Engineering Inc., 1725 Clarkstone Rd., Cleveland 12, Ohio.

Aluminum Mill Products

This brochure covers mill products from siding to billets. It includes data on characteristics, fabricating, finishing, and company services available. Dept. NR-4, Kaiser Aluminum & Chemical Sales Inc., 9191 N. Michigan Ave., Chicago 11, Ill.

Ground Flat Stock

This free 22 by 28 in. wall chart furnishes data on more than 1500 sizes of oil and air hardening tool steels. DoAll Co., Des Plaines, Ill.

Saves Money for Industry

This brochure of field reports on 20 industries shows how an original investment in material handling equipment of $9100 saved users over $86,000. It shows investments that more than pay for themselves in the first year of operation. Speedways Conveyors Inc., 189 Speedways Bldg., 202 Rhode Island St., Buffalo 13, N. Y.

Machine Tools

This 36-page catalog, MT2, covers milling, grinding, screw machines, and accessories. Brown & Sharpe Mfg. Co., Providence, R. I.

High Energy Radiation Guide

This 16-page document analyzes the difficulties in using plastics, metals, oils, bricks, glass, and other materials in the presence of high energy radiation. It is a guide for selecting materials for use in high level nuclear radiation fields. Instrument Society of America, 313 Sixth Ave., Pittsburgh 22, Pa.

Load Instruments

Three new bulletins on weighing, load measurements, and recording instruments for industry are available. They cover crane scales, light and heavy duty trucks, and other applications. Martin-Decker Corp., Long Beach 7, Calif.

Furnaces

Bulletin No. 85 details gas and oil fired, mechanical and hydraulic tilt, crucible melting furnaces for brass, bronze, aluminum, and other nonferrous metals. Stroman Furnace & Engineering Co., Franklin Park, Ill.

Cutting and Grinding Fluids

Information is available on three oil-type and three water-type products offering the correct lubricant-coolant for all metal removal needs. Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 32, Pa.

Steel Lockers

Bulletin B-60 presents 12 styles and the sizes available. Included are design and construction details. Penco Metal Products Div., Alan Wood Steel Co., 200 Brower Ave., Oaks, Pa.

Finishing Equipment

This 44-page catalog, Form 1169-B, details 15 machine models and three attachments. Included are sections on automatic size control, engineering service available, and floor plans. Gisholt Machine Co., Madison 10, Wis.

Silicon Rectifier Equipment

Bulletin GEC-1485, 4 pages, describes units providing 250 volts direct current at up to 600 kw. Ratings, charts, and graphs are included. General Electric Co., Schenectady 5, N. Y.

Ducting System Design

A 12-page catalog on "Thermoplastic Corrosion-Proof Ventilating and Exhaust Systems" explains how you can design your own ducting systems. Costs, components, and fittings are covered. American Agile Corp., P. O. Box 168, Bedford, Ohio.

Assembly Components

No. 15, a 24-page catalog, lists over 500 components, such as worm and wheel and speed reducer assemblies, helical gear assemblies, magnetic clutches, and instrument panel clocks. PIC Design Corp., subsidiary of Benrus Watch Co. Inc., 477 Atlantic Ave., East Rockaway, N. Y.

Fittings and Flanges

Technical data cards available: FDC-251 lists the approximate weights of forged steel flanges. FDC-250 covers weights of eight types of welding fittings in many sizes. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Determines Dew Points

Bulletin 2051, 8 pages, describes Alnor Dewpointers, used to determine dew points, water vapor density and pressure, and per-

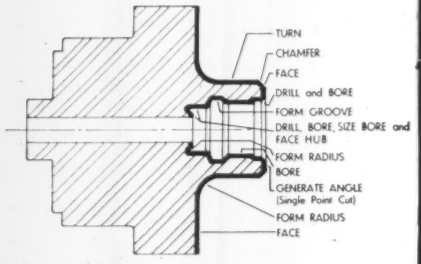
Let me show you*

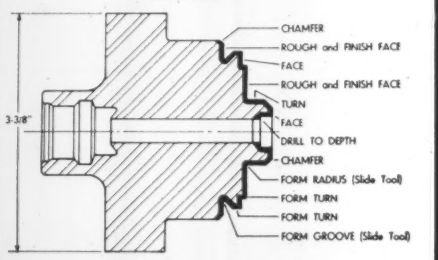
* *George Marr,*
P&J Representative
Pawtucket, R.I.
Telephone PAwtucket 5-6500

how a change to our P&J Automatics helped American Bosch . .

JOB FACTS:

PART: *Head for Diesel Engine Fuel Pump.*
MATERIAL: *Nitralloy G, 28-35 Rockwell C.*
REQUIRED: *25 separate turning, facing, boring and forming cuts, with most surfaces held to .0015".*
THE MACHINES: *2 P&J 3-U "Speed-Flex" Automatic Turret Lathes.*
THE RESULTS: *Part completed in 2 fully-automatic cycles. Floor-to-floor time 5.5 minutes!*



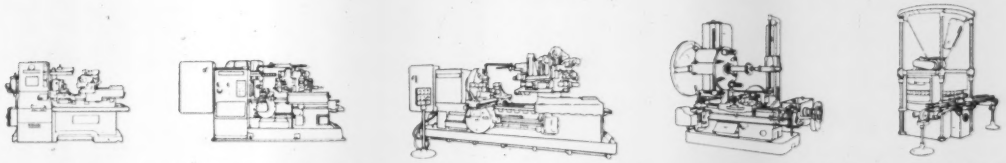


. . . . INCREASE PRODUCTION 45% AND REDUCE MAN-MACHINE HOURS 75%!

American Bosch Arma Corporation, one of the leading producers of automotive, electrical and diesel injection equipment, was using hand turret lathes to machine close-tolerance fuel pump heads. Two of these lathes – each with an operator – were working two 8-hour shifts per day, and a plant-wide survey showed that machining time and costs were too high. Called in to analyze the problem, we recommended two of our P&J 3-U "Speed-Flex" Automatics, with *both* machines to be operated by *one* man on a single 8-hour shift per day.

On the job 18 months, this installation has practically paid for itself in labor savings alone. Now, when the operator receives the workpiece, he chucks it in the first machine, and 12 cuts are completed in a single fully-automatic cycle. He then chucks the part in the second machine, and the remaining 13 cuts are completed. Floor-to-floor time is just 5.5 minutes . . . a 45% reduction over the old method. And 3 machinists have been released for other work.

If your manufacturing operations involve high-speed parts production, a switch from hand machines to P&J Automatics can also bring important benefits to you. Act today. Ask the P&J Representative in your area to analyze your requirements and recommend a production plan that meets your specific needs. If you prefer, write direct to Potter & Johnston Company, Pawtucket, Rhode Island.



AUTOMATIC TURRET LATHES . . GEAR CUTTERS . . . PACKAGING MACHINES

POTTER & JOHNSTON

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.

PRECISION PRODUCTION TOOLING SINCE 1898

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HOTEL CLEVELAND

Cleveland Room
Dine in the splendid old world setting of a grand dining room. The menu is varied, the service unexcelled.

Bronze Room
One of the brightest of the city's supper clubs. Dancing nightly from 9:00 p.m.
Air conditioned, of course.

Rib Room
A true specialty restaurant For Fabulous Roast Beef, roasted, carved and served to your order.

MEN'S BAR
Strictly stag — is this all male haven for good drinks, good food and good talk. Plus sports events on TV.

TRANSIT BAR
For rapid service in the most unique bar in the country . . . decorated with an outstanding collection of miniature trains.

the PATIO
Pause — in the relaxing, informal atmosphere of the gayly decorated Patio. It's a Cleveland habit to say — "Meet me at the Patio."

Coffee Shop
Service is brisk and decor cheerful in the modern, air-conditioned coffee shop. Enjoy a tasty sandwich or a moderately priced meal.

HCA Hotel Cleveland
CLEVELAND, OHIO

NEW LITERATURE . . .

centage water vapor by volume. Illinois Testing Laboratories Inc., 420 N. LaSalle St., Chicago 10, Ill.

Cool and Lubricate Tools

Form BC-1025-A describes equipment designed to provide a fine mist of coolant liquids or light cutting oils at the tool-work point of contact. These units permit removal of splashguards and elimination of dirty operations. DeVilbiss Co., Toledo 1, Ohio.

Lifts Materials

Automatic and motorized tongs for lifting material of any shape, weight, or size; sheet lifters, rack lifters, rotating hooks, and other hooks are described in this catalog. Materials Handling Div., Heppenstall Co., New Brighton, Pa.

Feeds and Piles Sheets

This bulletin describes an automatic overarm unit which delivers cardboard, plastics, or metals from stacks to conveyors or processing equipment. It also removes and stacks materials from machine tables or conveyors. De Florez Co. Inc., 116 E. 30th St., New York 16, N. Y.

Die Supplies

Catalog 70-A, covers die sets, special die sets and bolster plates, guide pins and bushings, springs, and accessories. Die Supply Div., E. W. Bliss Co., 1400 Brookpark Rd., Cleveland, Ohio.

Refractories

Leading refractory manufacturers are tabulated in an easy to read form under the headings of firebrick, cements, castables, plastics, and miscellaneous. Walsh Refractories Corp., 101 Ferry St., St. Louis 7, Mo.

Grinders and Finishers

Catalog 253, details a line of electrolytic carbide tool grinders including chip breaker and cup wheel units. Bulletin 751, covers abrasive belt, single and multihead flat finishers. Machines accommodate 6 to 12 in. belts. Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich.

Machine Figures Depreciation

Manual U-1113 covers the calculation of depreciation charges and reserves using the Univac 120. Remington Rand Univac Div., Sperry Rand Corp., 315 Fourth Ave., New York 10, N. Y.

Compression Systems

Bulletin 100 describes pre-engineered central compression systems for supplying air or gases at 3500 to 12,000 psi. Data include construction features and flow charts for mobile, semiportable, or fixed units. High Pressure Pneumatics Div., Cardox Corp., 307 N. Michigan Ave., Chicago 1, Ill.

Coated Abrasives

List prices and data are furnished in this new catalog. Armour Coated Abrasives Div., Armour & Co., Alliance, Ohio.

Sand Conditioning

"Sand Conditioning Topics" is published for the advancement of foundry and casting practices. Royer Foundry & Machine Co., Kingston, Pa.

Hard Surfacing

Catalog HS-127 serves as a guide for electrode, automatic, or semiautomatic welding work. It lists over 500 applications and equipment to be used. Electrode Div., McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.

Electric Kilns

Bulletin 258 describes periodic and continuous electric kilns which can be built for temperatures up to 5000° F. Included are kilns for pilot plants and production firing. Hevi-Duty Electric Co., Milwaukee 1, Wis.

Gas Regulators

Catalog 4490 furnishes specifications and ordering information for 47 industrial gas regulators. Uses and installations of CO_2 regulators and manifolds are included. Linde Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Aircraft Steels

This 72-page booklet is a guide for specifying and purchasing aircraft quality steels. Included is information on military and government aeronautical specifications. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

NEW BOOKS

Numerical Control Systems for Machine Tools, Proceedings of the Electronic Industries Association Symposium, Engineering Publishers, division of AC Book Co. Inc., G. P. O. Box 1151, New York 1, N. Y. 106 pages, $5.

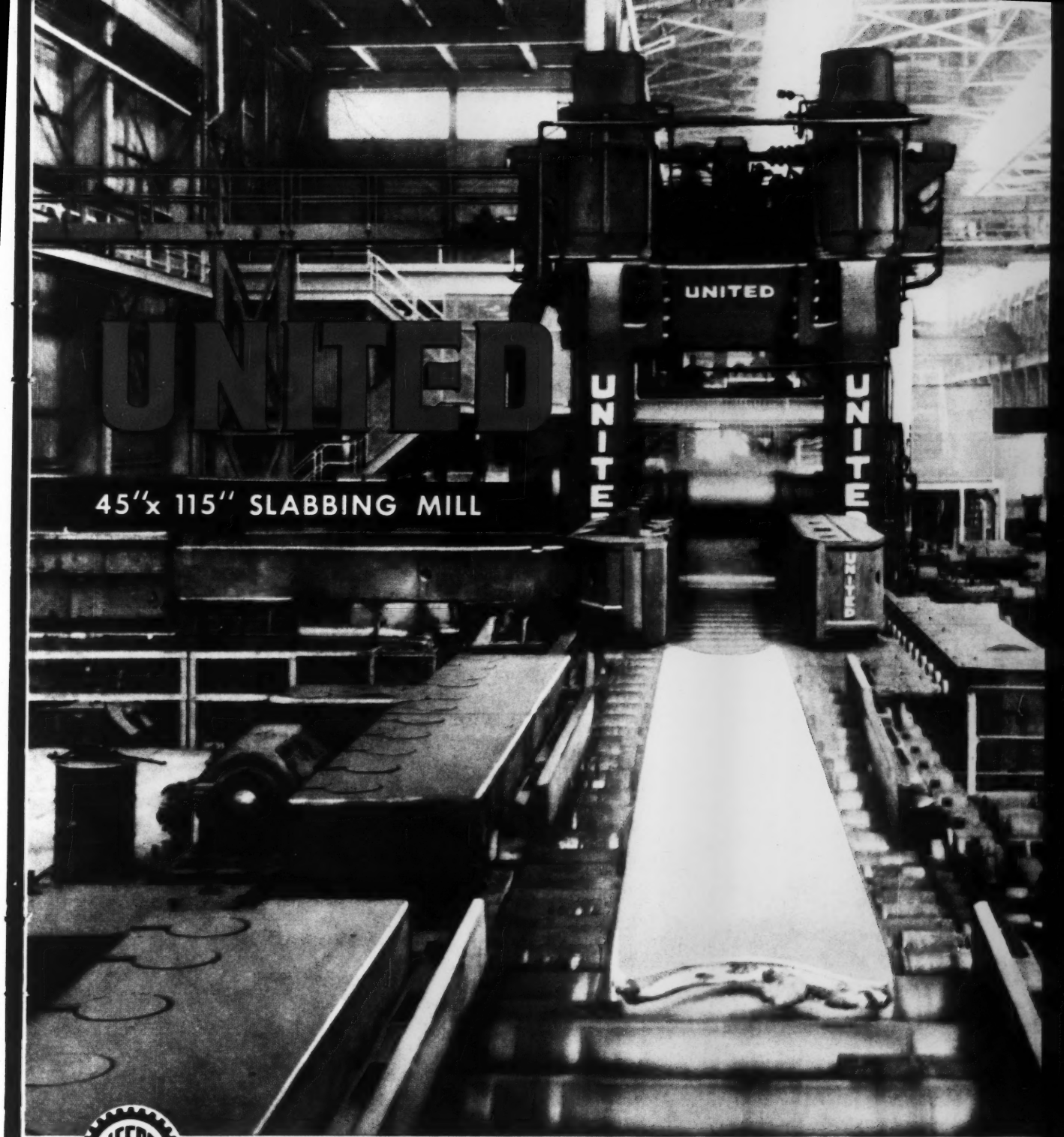
Texts of 15 technical papers describing the design and practical application of numerical control, plus an address by Lt. Gen. C. S. Irvine, USAF, are in this illustrated book. It also provides an analysis of manufacturing costs by manual and automatic numerically controlled methods.

Engineering Formulas and Tables, Lefax Publishers, Ninth and Sansom Streets, Philadelphia 7, Pa. 396 pages, $4.75.

This is a handy pocket reference, compact and easy to use. It contains information in the fields of civil, mechanical, and electrical engineers. There are sections covering mathematics, measures, materials, gages, structural data, and hydraulics. The book is in loose-leaf form with index tabs.

Nondestructive Testing Symbols, American Welding Society, 33 W. 39th St., New York 18, N. Y. $1.

Time and labor can be saved by giving complete welding and testing instructions in one symbol. This booklet presents the proper symbols to be used.



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington.

SUBSIDIARIES: Adamson United Company, Akron, Ohio
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Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Introducing Allied's

IRILAC™ #1000

New Clear Protective Coating for All Metals . . . as safe and easy to handle as Water!

New method of protection incorporates corrosion inhibitors in a water-soluble polymer base. Dries to an extremely thin, tough, durable coating—clear in color. Does not chemically affect base metal or any post-treatments. Used as a protective treatment alone or to enhance value of post-treatments.

Allied's new Irilac #1000 is a concentrated solution of a water-soluble polymer with built-in complex corrosion inhibiting materials. It was developed to answer the needs of the metalworking industry for a non-conversion process that will provide corrosion resistance and resistance to fingerprinting and abrasion on base metals and electrochemically or chemically finished surfaces without changing the appearance of the metallic surface.

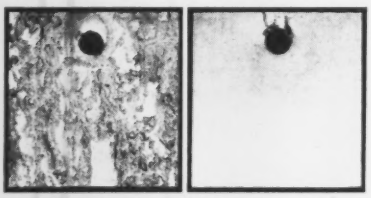
There are no hazards involved—Irilac is non-fuming, non-toxic, and requires no special fire prevention measures.

THE PROCESS

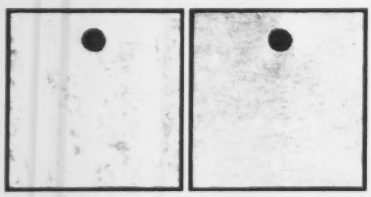
Irilac #1000 is diluted with water to provide a simple one-pass working solution. It is then applied by dip, brush or spray and forms a coating that quickly *bonds* to the metal surface without reacting with the surface.

THE PROPERTIES

The resulting coating is clear, transparent, thin yet durable. It has excellent water-resistant properties, and can be rubbed, handled and subjected to rough treatment. The surface to which Irilac has been applied is not altered in fact, the transparent coating brings full tone to colored surfaces and clarity to iridescent surfaces. The water-thin physical characteristic of the solution means that the coating provides protection in recessed areas that are difficult, if not impossible, to protect with other methods.



STEEL PANELS: bare (left) and coated with Irilac (right) after 8-hour salt spray.



ALUMINUM PANELS: bare (left) and coated with Irilac (right) after 168-hour salt spray.

WHERE IRILAC CAN BE USED

Irilac #1000 can be applied to *any* metal—wet or dry—treated or untreated. All metals can be processed in *one* operation in the same solution. It can be applied in conjunction with any process—over Iridite, anodized, phosphated surfaces, black oxide, etc. Surfaces treated with Irilac provide a good base for paint.

APPLICATION ADVANTAGES

No other process or material available for the protection of metals offers all the application advantages found in new Irilac #1000:

1. It can be applied to *any* clean metal simply by dip, brush or spray. No special equipment is required.
2. Saves time—just apply and dry—no reaction time required.
3. No hazards involved—no exhaust or special fire protection equipment is required. Irilac is non-fuming and non-toxic.
4. Saves space. Presents no disposal problem. Low in first and final costs.

Because of its versatility and complete safety, Irilac has unlimited uses. For example, it will protect aluminum furniture, brass hardware and fixtures, steel parts of all types, zinc castings, etc. In fact, any base metal or plated surface, or those treated with electrolytic or chemical post-treatments, can be improved or enhanced with Irilac.

IRILAC #1000 MAY BE THE ANSWER TO YOUR PROTECTION PROBLEM

Our development staff will be glad to work with you to determine the significant benefits Irilac can offer you. Simply send us some parts and let us show you what Irilac can do. No obligation, of course.

Allied Research Products, Inc.

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***Manufacturers of* IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals**
West Coast Licensee: L. H. Butcher Co.

Market Outlook

STAINLESS steel producers aren't letting the price reduction on aluminum push them into similar action just to remain competitive. But the price move initiated by Nathanael V. Davis, president, Aluminium Ltd., has made them apprehensive for another reason. They believe it may tend to discourage future price increases.

Mr. Davis declared that a reduction of 2 cents a pound for aluminum would make it "more competitive with other materials." He didn't specify what materials, but, traditionally, the competitive metals are copper (electrical applications), zinc (diecastings), and stainless steel (curtain walls and automotive trim).

STEELMAKERS REACT— Asked to comment on the probable consequences of the aluminum price cut, a stainless steel sales manager declared: "Aluminum sheets were 10 cents a pound cheaper than stainless in 1954, and the gap has since increased. Why should we worry about additional costs?" He conceded that a widening of the gap might hurt in cases where consumers are on the fence, but stated: "We don't cut prices just to maintain our market share."

However, the competitive situation makes it doubtful now that steelmakers in general will try to pass along all the additional costs they'll incur on July 1 when higher wages go into effect.

NO UPTURN YET— Also casting doubt on the likelihood of midyear price increases is the continued softness in demand from major consumers. Warehouses are loaded; automotive buying is almost nil; and construction hasn't taken up the slack. Steelmakers don't think business will get much worse, but they've shelved their hopes for improvement until the fourth quarter.

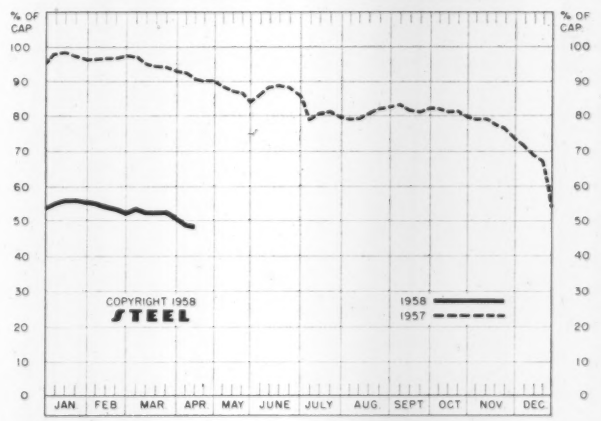
MEMPHIS DECISION HURTS— When a U. S. court outlawed the usual method of granting rate increases to pipeline operators last November, gas transmission projects came to an abrupt halt. Line pipe manufacturers have been suffering ever since. Willard F. Rockwell Jr., president of Rockwell Mfg. Co., Pittsburgh, estimates that the decision has already cost the economy $1 billion and 100,000 jobs. There's no relief in sight until fall, when the Supreme Court will review the case.

AUTO SALES PICK UP— During the last ten days of March, retail deliveries of new cars averaged 15,500 daily. This was a 19 per cent increase over the middle third of the month, when average daily volume was 13,000 cars. Although late March sales were down nearly 32 per cent from those of the like 1957 period, they were the highest so far in 1958 for any third of a month.

PRODUCTION DIPS— Despite indications that car sales are on the rise, automakers are keeping a tight rein on production. Ford Motor Co.'s steel plant will be closed for six weeks until May 5, instead of three. With Great Lakes Steel Corp., a subsidiary of National Steel Corp., also shut down, Detroit's ingot rate is about 11.5 per cent. Nationally, steelmaking declined a half point last week to 48 per cent of capacity. Production was about 1,294,000 net tons of steel for ingots and castings.

AUTOMAKER UNLOADING?— Burdened with an excessive flat-rolled inventory, one automaker is reported ready to sell about 5000 tons at a price lower than mills are quoting. The company figures it's cheaper than paying storage.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

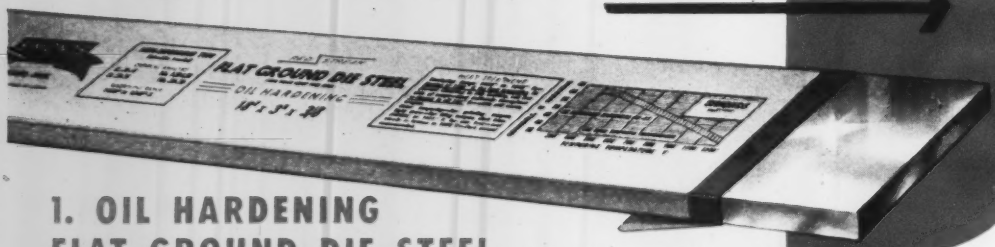
	Week Ended Apr. 13	Change	Same Week 1957	Same Week 1956
Pittsburgh	49	— 3.5*	95.5	103
Chicago	53.5	+ 0.5	90	103
Mid-Atlantic	49	0	95	99
Youngstown	46	+ 1	89	100
Wheeling	68	+ 0.5	93.5	98.5
Cleveland	30.5	— 4*	86.5	95.5
Buffalo	39	+ 2	97.5	105
Birmingham	55.5	+ 2.5*	95.5	93
New England	45	— 3	55	85
Cincinnati	40	— 6*	81	93.5
St. Louis	65.5	— 4.5	101	99.5
Detroit	11.5	—11*	95.5	95.5
Western	55	— 8	102	104
National Rate	48	— 0.5	90.5	99.5

INGOT PRODUCTION‡

	Week Ended Apr. 13	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	81.3†	81.7	91.1	143.8
NET TONS (In thousands)	1,306†	1,312	1,463	2,310

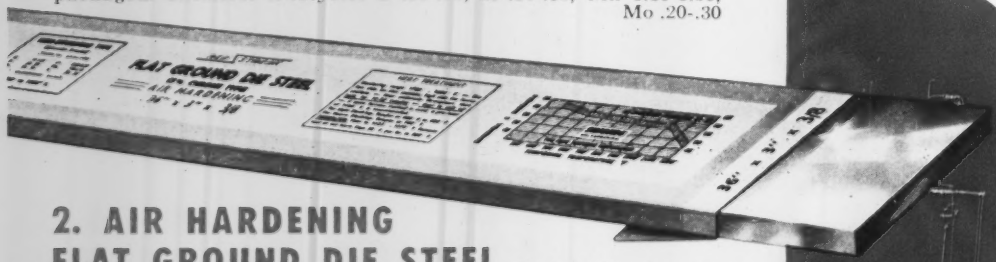
*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

SIMONDS gives you all 3



1. OIL HARDENING FLAT GROUND DIE STEEL

Simonds quality-controlled tool steel . . . precision ground . . . ready-to-use . . . comes in 1001 stock sizes for 1001 uses: punches, dies, machine parts, small tools, etc. Spheroidize-annealed for best machinability. Wide hardening range. Oil quench 18" and 36" lengths . . . flats and squares . . . individually packaged. *Chemical Analysis:* C .85-.95, Si .20-.35, Mn 1.30-1.50, Mo .20-.30



2. AIR HARDENING FLAT GROUND DIE STEEL

This 5% chrome, spheroidize-annealed tool steel has exceptional wear-resistant qualities yet is easy to machine and heat treat. Ground to accurate dimensions . . . suitable for a multiplicity of uses . . . individually packaged in a wide range of stock sizes . . . flats and squares . . . standard 36" lengths (18" lengths also furnished, if desired). *Chemical Analysis:* C .95-1.05, Cr 5.00-5.50, Si .30-.50, Mn .50-.70, Mo .90-1.10, V .20-.30

3. and the NEW LOW CARBON FLAT GROUND STEEL

Here's a fine-grained, forging quality, silicon-killed steel that offers important savings on jigs, fixtures, patterns, stripper plates, punch pads, die plates, die-blocking shims . . . and parts that don't require heat treatment, or in some cases just case-hardening. This new line of low-cost steel rounds out the Simonds line of Flat Ground Steel, has equally fine finish, with excellent welding quality and machinability. Furnished in a wide range of flats from 1/16" to 1 1/2" thick and 1/2" to 16" wide, and in squares from 3/8" to 2 7/8". All sizes come in standard, ready-to-use 24" lengths, individually packaged. *Typical Chemical Analysis:* C .18, Mn .50, Si .20, S .04, P .04

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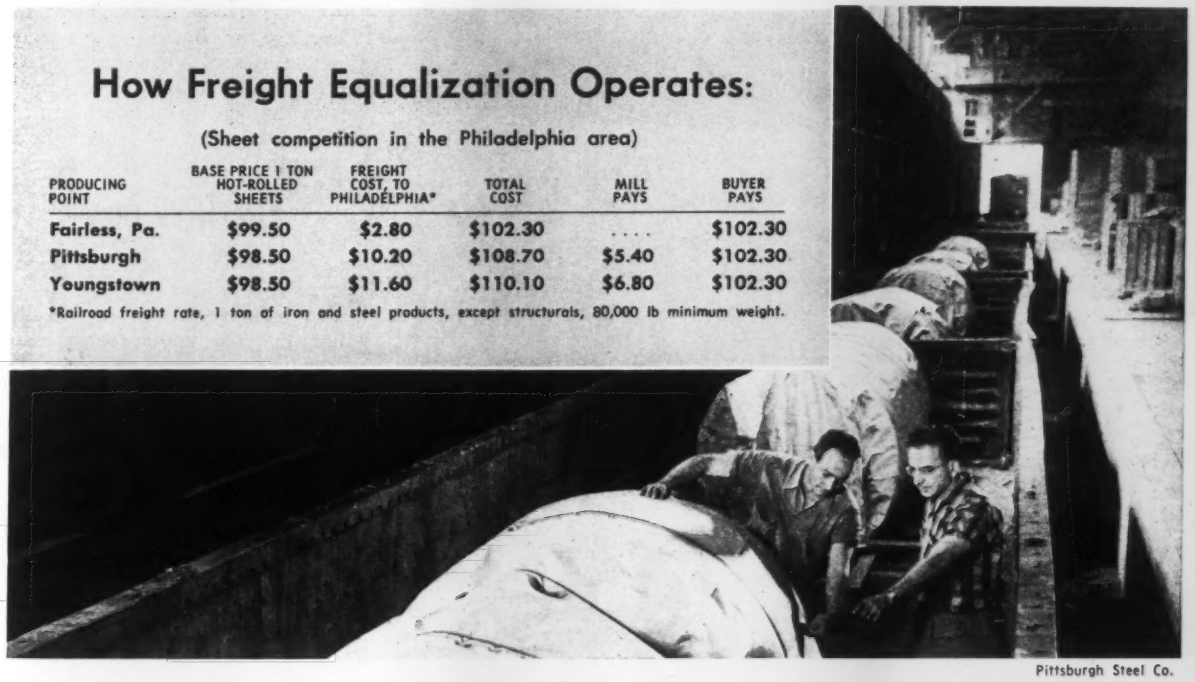
Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

How Freight Equalization Operates:

(Sheet competition in the Philadelphia area)

PRODUCING POINT	BASE PRICE 1 TON HOT-ROLLED SHEETS	FREIGHT COST, TO PHILADELPHIA*	TOTAL COST	MILL PAYS	BUYER PAYS
Fairless, Pa.	$99.50	$2.80	$102.30	....	$102.30
Pittsburgh	$98.50	$10.20	$108.70	$5.40	$102.30
Youngstown	$98.50	$11.60	$110.10	$6.80	$102.30

*Railroad freight rate, 1 ton of iron and steel products, except structurals, 80,000 lb minimum weight.



Pittsburgh Steel Co.

Mills Pay More Freight

Slow sales prompt steelmakers to ship farther, pay more shipping costs in quest for new markets. Fabricators press steelmakers to extend equalization to plates and structurals

SUPPLIERS of steel products are broadening the scope of freight equalization by pushing into new market areas farther from producing points, and if demand doesn't perk up, you can look for the extension of equalization to plates and structural shapes within six months.

The buyer has been paying the freight on shipments of those two products since 1953. Shipments of all other steel products have been subject to equalization: The buyer pays the cost of shipment from the nearest producing point for the product, regardless of the mill he patronizes.

Buyer Has Say—It's not hard to explain the situation. Under present market conditions, the buyer can demand and get:

1. Quick delivery. If the mill next door can't fill an order fast enough, the buyer will go farther down the street until he finds someone who can meet his requirements.

2. Lowest possible freight cost on all products. Says a Michigan buyer: "We continue to pay freight costs on shipments of plates and structurals, but we will buy only from the nearest mill. We don't have to buy from a distant mill now."

3. Lowest possible price. Foreign-produced wire and pipe sell in this country because they are cheaper than their domestic competitors. But price is not always a key factor. A Pittsburgh steel buyer reports: "A New York broker offered us plates at a lower-than-market price last week. We didn't buy. We had no way of knowing where the steel came from or how good it was."

Shipper Will Pay—In a sales situation dominated by the buyer, the shipper's costs are certain to rise. An eastern district sales manager for an Ohio sheet producer says: "Last year we did not accept orders for sheets from Philadelphia. We had enough business in Ohio to keep mills operating at capacity. To sell in Philadelphia we would have to equalize with the Fairless, Pa., producing point, which is less than 35 miles from that city. This year, with sales to Ohio firms well below normal, I would accept a Philadelphia order without hesitation, in spite of a $12-per-ton shipping cost."

Says a Pittsburgh tubemaker: "Our competitors are raising their limits on the amount of freight they will pay. We automatically accept any order in which our freight cost will be less than $10 per ton. One of our competitors will pay as much as $14 per ton for freight. If freight costs are greater than $10, our district offices query us before accepting the order. With demand for pipe low, we are accepting a larger proportion of orders involving high freight costs. We are turning down orders only when freight costs

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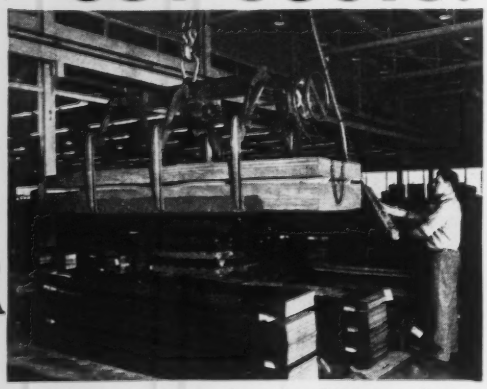

The A. B. Dick Company, Niles, Illinois, found that this C-F Lifter has substantially reduced man hours and crane time required to move stock in and out of storage.

Up to 10,000 lbs. of high grade sheets in varying widths may be picked up, carried and unloaded at shears or machines with speed and economy by the Lifter and its operator.

C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons. Bulletin SL-25 describes the advantages you can obtain from C-F Lifters. Write for it today.

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would wipe out our profit margin."

Beating the Bushes—Pittsburgh-area steelmakers are using low-cost barge transportation to expand markets in the South and Southwest. A 500-ton shipment of tubes from Pittsburgh to New Orleans costs $7.34 per ton. "We can ship tubes to 90 per cent of the oil drillers in this country for less than $10 per ton," says a Pittsburgh sales manager.

Top management is generally willing to accept higher freight costs as the price of a broader market. "We can sell our pipe and cold-rolled sheets in Chicago, so we'll ship there and equalize with the cost of the nearest mill," says an Ohio steelmaker. "We're serving west coast markets with pipe," adds a West Virginia producer.

"By scattering our shots and looking farther for customers, we strengthen our operations," a mid-western sheet producer summarizes. "It's true that we have higher freight costs, but we profit in lean years by widening our market."

Dissent Gets Weaker—Producers of plates and structurals shapes continue to resist the trend to full freight equalization. A leading plate producer in Pittsburgh explains his stand: "At reduced operating rates, and with labor costs due to rise in three months, we can't afford higher shipping costs. We don't normally supply plates to eastern seaboard plants. We would save money by staying in our own backyard and waiting for demand for line pipe and railroad equipment industries in this area to recover."

Despite that seller's determination to avoid higher freight charges (a position shared by his competitors), he is well aware that operations at 50 to 55 per cent of capacity aren't normal. Says an eastern Ohio plate supplier: "Last year, consumers in Pittsburgh were willing to pay freight costs of $3.60 per ton for shipments from our mill. This year they will not."

After three months of low demand for plates, it's not surprising to see cracks appear in the solid front against equalization. One or two small eastern mills are offering to absorb some freight on shipments to warehouses and other small volume buyers in western Pennsylvania. A western Pennsylvania plate producer is tempted to sell to the boom-

ing shipyards on the Atlantic Coast.

Buyers Won't Buy—Adding to pressure for freight equalization on plates are large stocks generally held by fabricators and rapid deliveries from all mills. A steel mill equipment maker comments: "Last year we paid premium prices for plates. With an oversupply now, we wouldn't buy the product at lower-than-mill prices. We have no incentive to pay for freight from a distant mill."

The director of commercial research for a midwestern steelmaker summarizes: "It will be a long time before we have too little capacity. During this intervening period, we can no longer be selective about where we ship our steel."

Steel Bars . . .

Bar Prices, Page 201

Prompt shipment demand for carbon and alloy bars dominates the market. The mills are booking April shipment tonnage in both hot and cold-drawn classifications. While consumers' inventories are low, they can depend on early shipments to cover their immediate needs.

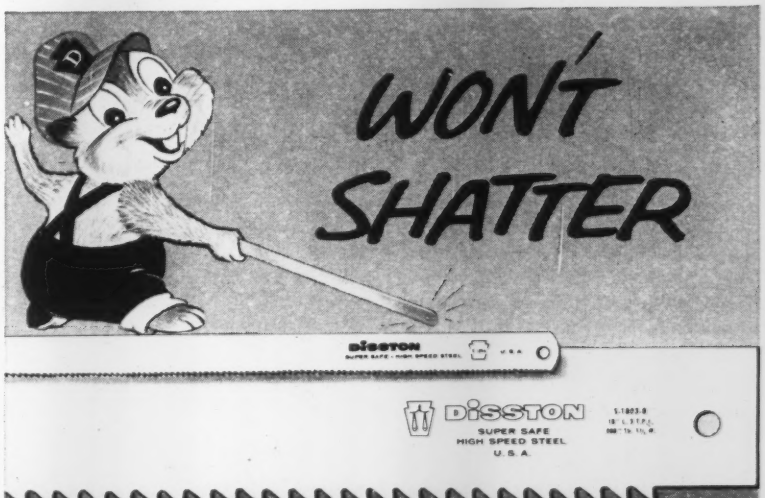
Relatively little carbon bar volume has been booked for May delivery, and forward buying is not expected to develop in volume so long as current two to three week shipments are available from the mills.

Pittsburgh sellers say March bookings were under those in January and February. They don't see much change in volume this month.

Manufacturers of farm implements appear to be ordering in better volume than other major consumers. They started on the comeback trail last October. But tractor manufacturers aren't doing too well. Caterpillar Tractor Co. has returned to a five-day week, but so far, sellers haven't received any new bar orders from that company.

Warehouses appear to be well stocked with bars, and cold drawers are buying only what hot bar stock they need to maintain minimum stocks or fill orders. Automotive ordering continues negligible.

It's rumored Pontiac may switch from a forging to a cast steel crankshaft in its 1959 models. That



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DISSTON DIVISION

would be bad news for barmakers. Also reported: General Motors may switch from coil springs to torsion bars or air springs.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 201

Demand for concrete reinforcing steel bars is exceptionally good, compared with activity in other areas of the steel market. Requirements are expanding seasonally as construction projects, public and private, get going.

Bethlehem Steel reports the first pickup in its Specialty Products Dept. and has recalled about 200 workers. It produces components for auto body frames, highway guard rails, concrete reinforcing bars and specialty items for highways and buildings.

Importing of reinforcing material has been affected by a Texas Highway Department change in specifications. It rules out the use of steel produced by the bessemer or Thomas processes. Importers are seeking a modification of the specifications.

Pending work in the Pacific Northwest involves several thousand tons for a Portland, Oreg., shopping center, and 1175 tons for Glasgow Air Base, Montana.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 202 & 203

Sheetmakers are not too optimistic for the immediate future. April orders are dragging bottom; some smaller consumers are placing limited tonnage for early shipment. Larger users are still drawing on inventories, or are holding new orders to a minimum.

In the East, stamping shops are not buying ahead, covering only against short run contracts. But office furniture manufacturers in the district are ordering in slightly larger volume than they were.

Galvanized sheet inquiry for construction requirements is modestly improved, but is not up to seasonal expectations.

Some midwestern mills report sales of cold-rolled and galvanized sheets are up slightly, but no significant change in demand on automotive and appliance account is noted.

Pittsburgh mills say auto demand seems to be going from bad to worse. Fisher Body, which has been on one turn, five days weekly, is closed completely this week. Fisher has placed no business with one mill since Mar. 1 when it ordered April tonnage. Part of that order is being held up for late May shipment. Fisher Body usually buys on a two-week basis.

National Steel Corp.'s Great Lakes subsidiary, Detroit, heavily dependent on automotive business, is closed down for a second week. Granite City Steel Co., Granite City, Ill., plans to resume operation of its cold sheet mill about mid-May. It's down for repowering. March was the best shipment month for Granite City so far this year, with hot-rolled sheet shipments appreciably above those in February.

Pittsburgh steel mill machinery manufacturers, aided by order backlogs, are still actively in the market for sheets.

The Strip Steel Div., Jones & Laughlin Steel Corp., Youngstown, has resumed production after being idle a couple weeks.

Reports are circulating in the Detroit area that one of the Big Three is planning to sell surplus flat-rolled steel at below mill prices. (The auto builder will not comment.) It is said the company will offer 5000 tons to see how the tonnage goes. If the sale is successful, it may offer more.

Stainless Steel . . .

Stainless Steel Prices, Page 205

"There's a tremendous upsurge in inquiries from all industries except the automotive, but, unfortunately, we've no new orders to substantiate our hopes."

That's the way the sales manager for a Pittsburgh producer of stainless sheets and strip describes the market situation. January, February, and March sales were at about the same level. April volume doesn't look any better.

Stainless steel producers are not too concerned by the reduction in aluminum prices. They point out that they were substantially below those of stainless before the cut was made. Widening the price differential won't make much differ-

*Product Development by William M. Schmidt Associates.

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The orientation of television, AM-FM radio and phonographic elements into one modular housing containing all mechanical, electronic and control devices is one function of the mock-up illustrated. Another is the utilization of H & K perforated metal for the necessary ventilation and sound requirements of such equipment.

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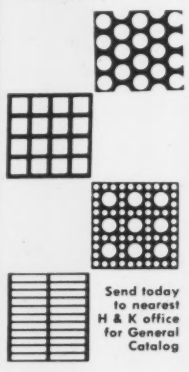

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ence from a competitive angle. Some interests feel that construction and transportation markets may be in jeopardy unless a comparable price cut is made on stainless.

Bridgeport, Conn., has been established as a producing and shipping point by Carpenter Steel Co. It will handle all its grades of stainless shipped to the major part of New England and the metropolitan New York City area. The company is producing stainless in Bridgeport at its recently acquired subsidiary, Carpenter Steel of New England Inc.

Users will benefit through reduced freight charges. Areas affected: Metropolitan New York, including northern New Jersey; Rhode Island; Connecticut; all but the northwestern part of Massachusetts; the eastern half of New Hampshire; most of Maine.

Plates . . .

Plate Prices, Page 201

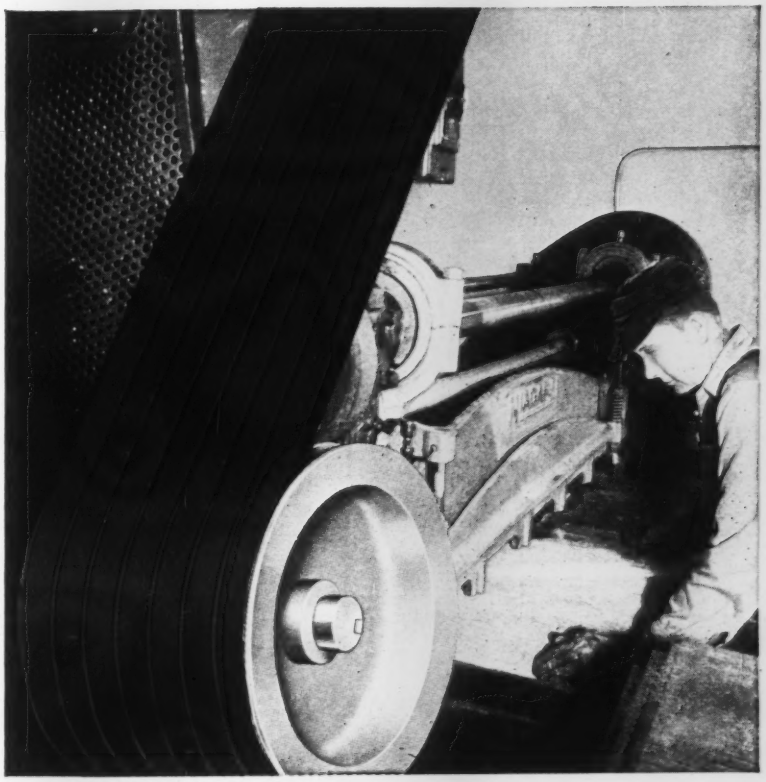
Shipbuilding requirements provide the brightest spot in the plate market, with tonnage for several vessels booked by eastern shipyards yet to be placed. Still, some shipbuilders reportedly hold enough plate in stock to last them through June.

Normally, shipyard buying is of a long term nature and puts only slight pressure on mill scheduling. Recent orders include 2000 tons by the Navy for Portsmouth, N. H.

Demand from structural fabricating shops is slightly improved, but orders on heavy equipment account continue to be light. Tank volume is slightly larger, but most tankshops are meeting their expanded spring demands from stocks ½ in. and under.

A Pittsburgh maker says March shipments were far below last year's level, but they were "quite good by 1958 standards." This producer thinks volume should be better this month and next. Of 6000 tons of plates and structurals slated for May delivery in the Louisville area, only 1000 tons were ordered from the mills.

The slowing down in industrial expansion has hurt plates, but there are still a lot of jobs going up. Expectations are that once fabricators have worked off their inven-



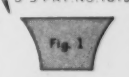
Industry's No. 1 choice... the V-Belt with concave sides

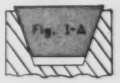
Here's the reason:
the concave sides of Gates V-Belts *insure far longer belt life.*

Make this simple test. Bend a Gates V-Belt with concave sides (Fig. 1) as if it were going around a sheave. Feel how the sides *fill out* . . . become perfectly straight (Fig. 1-A). Note how this belt makes full contact with the sides of a sheave . . . grips the sheave evenly, distributing wear uniformly across the sides of the belt. Uniform wear lengthens belt life — keeps costs down.

Now make the same test with a straight-sided belt (Fig. 2). Feel how the sides bulge out, (Fig. 2-A) concentrating wear at the points shown by arrows. Uneven wear shortens belt life; increases belt costs.

Because Gates V-Belts with concave sides are so universally preferred, they are also the *most widely available*. There are Gates distributor stocks in industrial centers throughout the world.





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Here is an exciting application where the use of Bliss & Laughlin's Strain-Tempered* Steel simplified a machining problem and eliminated service failure.

The yoke posts in this pin press are subjected to heavy stresses when the screw exerts full pressure, thus requiring a tough, high-tensile steel.

Formerly made from heat-treated C-1035 and C-1040, these posts gave considerable trouble during fabrication because of distortion and poor machinability.

The substitution of C-1144 Strain-Tempered Steel has provided the high strength needed with an accompanying increase in machinability and freedom from warpage . . . saving costly heat treating and giving greatly improved service life.

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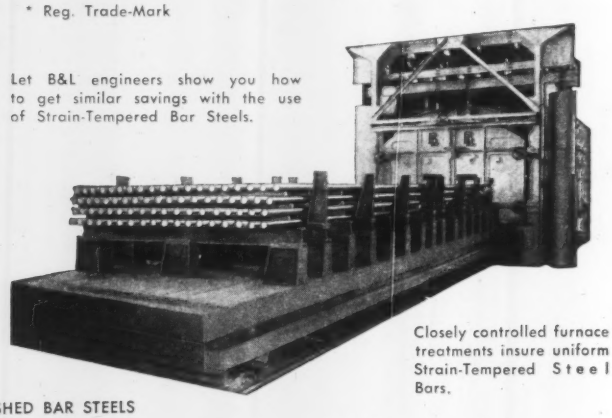

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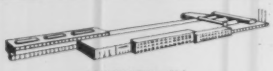
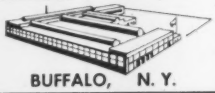
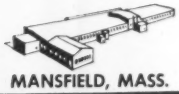


HARVEY, ILL.

DETROIT, MICH.



BUFFALO, N. Y.



MANSFIELD, MASS.

tories they'll be back in the market. Some sellers think there may be some hedge buying soon in anticipation of a price increase at midyear.

Bids are in at Portland, Oreg., on requirements for the Bull Run water supply line involving 200 tons of plates. Water and fuel storage projects at Helena, Mont., and McChord Air Field, Washington State, call for sizable plate tonnages.

Eastern mills report a decline in specialties in their product mix. It is slowing operations of integrated fabricating divisions.

By July 1, Lukens Steel Co., Coatesville, Pa., will be producing welding electrodes for all plate specifications produced by the company.

Tin Plate . . .

Tin Plate Prices, Page 203

Tin plate continues to lead the pace in the steel product markets. Indications are order volume will hold at comfortably high levels past mid-year. Canmaking is accelerated at this season in anticipation of summer food packs.

Wire . . .

Wire Prices, Pages 203 & 204

Wire sales volume continues disappointing. Demand is about the same as it was in March. No pickup is noticeable in manufacturers' wire, and the seasonal gain in merchant products is not up to expectations. A particularly disturbing factor in the merchant trade is the continued sluggishness in fencing and barbed wire.

Imported products continue to hurt domestic sales at some points. Competition from abroad is increasingly keen. Texans are said to be buying Dutch barbed wire which is $2.70 less per spool than the domestic product.

Tubular Goods . . .

Tubular Goods Prices, Page 205

Tubular goods are showing a little more life. Mill backlogs are small, and deliveries (notably seamless) are available within a week. Orders for merchant and oil country classifications are ahead of first quarter volume.

Broadening construction needs are stimulating merchant demand seasonally. The resumption of operations at two large producing plants reflects a pickup in line pipe requirements.

Republic Steel relighted four open hearths at its Gadsden, Ala., plant and will resume operations on its large diameter pipe mill there this week. A blast furnace is being reactivated there, and production will be resumed at the coke plant and the plate mill. The stepped-up operations result from an order for large diameter pipe which will keep the plant busy for several weeks.

Youngstown Sheet & Tube Co. plans to reopen its electricweld mill which has been closed down since December. It will roll large line pipe to fill orders that have been on its books six months or more.

Oil well drillers are expected to concentrate on inventory liquidation over the coming months. Well drilling is at its lowest point in months.

Pressure tubing sales are fair, but demand for mechanical tubing is poor; orders from auto builders and machine tool manufacturers are sparse.

Here's how the sales manager of a Pittsburgh mill views the market: "Two situations affect us adversely. First, there's continuing liquidation of inventories of oil country goods. Second, there's this Memphis court case that's holding up line pipe work."

Demand for cast iron pipe is active. Substantial orders are reported booked by sales agencies in the Pacific Northwest. In the Southwest, E. B. Germany, president, Lone Star Steel Co., Lone Star, Tex., last week told the Texas legisature his company planned to return to two-shift operations in the cast iron pipe division within a week or two. The company's sales are said to have skyrocketed in the last couple weeks, and its inventories are falling.

Ferroalloys . . .

Ferroalloy Prices, Page 208

The closing down of the Pittsburgh Metallurgical Co. plant at Niagara Falls, N. Y., brought the last of seven electric furnaces there to a halt last week. The plant has been cutting back steadily since the first of the year. Expectations are the shutdown will continue for a month.

Warehouse . . .

Warehouse Prices, Page 206

Spring has brought no significant improvement in warehouse business in most districts. Bookings are up as much as 20 per cent over the March rate in the Chicago district. It's too early to tell whether this improvement will hold throughout the month. Prospects for a substantial pickup in the second quarter are dim.

The average order is smaller than normal in all product classifications. Tin plate is moving well from the mills, but warehouses are getting little of the business.

Distributors' inventories are ample but are not considered excessive. There's no necessity for big stocks when mills can deliver any product within two to four weeks. Warehouses are placing only light orders with mills and are specifying short leadtimes.

Biggest problem for the warehouse industry is mill competition, especially in wide flange beams. Mills are going after orders of 3, 4, and 5 tons. Distributors must meet the mill price when selling to accounts with good credit, or beat the price by offering secondary material. Prices are firm on most carbon and alloy products.

Fabricating departments, including shearing and flame cutting, are not operating at more than 50 per cent of capacity.

Ziegler Steel Service Corp., Los Angeles, is carrying stocks of Armco ingot iron for remelting by the induction furnace process. The material is used as a base for stainless or other alloy castings and provides a composite check analysis of carbon, manganese, phosphorus, sulfur, and silicon, not to exceed 0.14 per cent.

Price schedules are well maintained in the Seattle district, but there is price cutting in overlapping territory.

Foreign producers are seeking business in the Pacific Northwest, offering substantial cuts below local price levels. One importer is quoting reinforcing bars as much as $37 below the domestic price; structurals, $30 lower; wide flange beams, $24; merchant bars and angles, $32; rounds, $27; and flats, $25 to $27.

As far as known, no significant

tonnages of foreign steel have been booked for delivery in that area, but it is feared some fringe dealers may be attracted by the quotations. Established houses state they are not interested, preferring to continue business through regular channels.

Pig Iron . . .

Pig Iron Prices, Page 206

Merchant pig iron demand remains light. Foundries are ordering hand to mouth. A pickup in the construction industry and its related lines is expected to spur demand for some types of castings in the weeks ahead. Manufacturers that make equipment for the construction industry should be buying castings more actively.

Farm equipment foundries have been the busiest in the Chicago district. But their purchases of cast scrap are smaller than they were, forcing down prices $2 to $3 a ton, following a prolonged period of firmness. It may be a bad omen for pig iron demand. Foundries are favoring the purchase of scrap as much as possible because it is cheaper than pig iron.

Of the Chicago district's 43 blast furnaces, 22 are in production. That's the smallest number, barring strikes, since March and April, 1940, when 21 out of 40 were active. Inland Steel Co. idled its No. 2 furnace at Indiana Harbor, Ind., Apr. 5. Six of its eight blast furnaces are running.

The movement of merchant iron from Buffalo to upper lake ports is getting off to a slow start. Bookings are considerably below what they were at this time a year ago.

Republic Steel's blast furnace at its Warren, Ohio, steel plant set a monthly production record in March. It produced 62,092 tons of iron, topping the previous corporation record at 56,050 tons, which the same furnace set last January.

Steel Shipments Smaller

Shipments of finished steel products in February totaled 4,262,935 net tons, reports the American Iron & Steel Institute. In January they came to 5,215,417 tons. The February, 1957 total was 7,066,732 tons.

Products shipped in greatest tonnages during February were: Cold-rolled sheets, 702,075 tons; hot-rolled sheets, 435,147 tons; plates, 434,711 tons; electrolytic tin plate, 397,861 tons; hot-rolled bars (including light shapes), 384,877 net tons.

Markets receiving the most steel from mills during the month include: Automotive, 728,139 tons; warehouses, 679,998 tons; construction (including maintenance), 590,619 tons; containers, 492,288 tons; and machinery, industrial equipment and tools, 238,632 tons.

In the first two months of this year 9,478,754 net tons of steel were moved. That compares with 14,876,129 tons in the like period of 1957.

Semifinished Steel . . .

Semifinished Prices, Page 201

Steel ingot operations have slipped another half point. At 48 per cent of capacity they are the lowest, barring strike and holiday periods, since May, 1939, when the rate averaged 47 to 49 per cent.

Indications are that ingot production is bumping bottom.

There should be a "marked improvement" in the steel industry by the latter part of this year or early next year, Roger M. Blough, chairman, U. S. Steel Corp., said last week while visiting San Francisco. He noted more consumers are seeking quick deliveries, and said this indicates steel is being used up faster than the industry is producing it.

While additional curtailments are noted, chiefly in the Pittsburgh area, some idle plants are being reactivated. Republic Steel, for example, is starting up open hearth, blast furnace, coke, plate, and pipe mill facilities at Gadsden, Ala. Some 600 employees are being recalled.

Colorado Fuel & Iron Corp., Denver, has recalled several hundred workers. This company expects a pickup in new orders and releases on old orders.

What is believed to be the largest pour of concrete in the history of the Calumet region's (Chicago) industrial construction took place Mar. 25. The site: Inland Steel Co.'s No. 3, cold strip, 4 stand tandem mill in East Chicago, Ind.

Ready-mixed concrete flowed into forms for the mill and drive foundation for 22 hours, taking 3322 cu yd of material.

Iron Ore Statistics—February, 1958

STOCKS OF IRON ORE ON MAR. 1, 1958
(Gross tons)

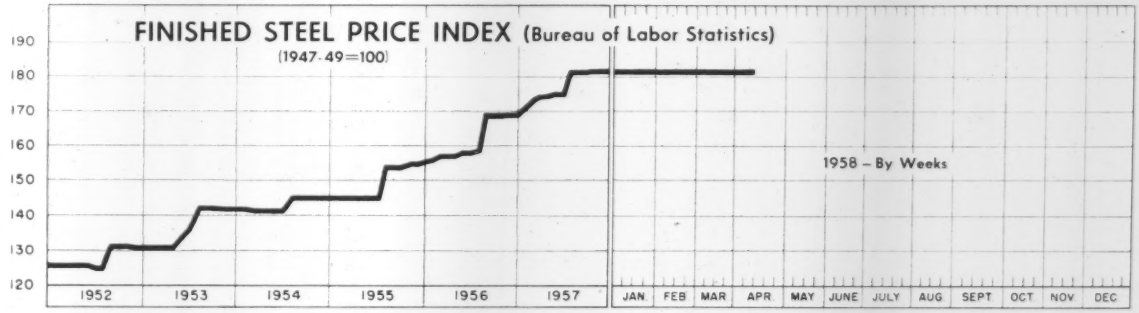
Stocks at	U. S. Ores		Canadian Ores		Foreign	
U. S. Furnaces:	L. Superior	Other	L. Superior	Other	Ores	—Total—
Eastern	4,239,544	203,051	271,271	1,819,769	3,138,911	9,672,546
Pitts.-Valley	9,841,442	64,228	627,618	2,185,992	3,363,526	16,082,806
Cleve.-Detroit	8,798,358	108,621	340,758	294,913	198,344	9,740,994
Chicago	10,549,354	(a)	(a)		(a)	10,549,354
Southern	(a)	2,182,046		(a)	1,354,387	3,536,433
Western		797,102				797,102
Total	33,428,698	3,355,048	1,239,647	4,300,674	8,055,168	50,379,235
At U. S. Docks:						
Lake Erie	3,971,339		113,505	938,116		5,022,960
Other U. S.				(a)	(a)	(a)
Total	3,971,339		113,505	938,116	(a)	5,022,960
Total U. S. Stocks	37,400,037	3,355,048	1,353,152	5,238,790	8,055,168	55,402,195
Canadian Stocks	1,752,130		24,498	470,139	146,089	2,392,856
Total U. S.-Canada	39,152,167	3,355,048	1,377,650	5,708,929	8,201,257	57,795,051

CONSUMPTION OF IRON ORE—FEBRUARY, 1958
(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
U. S. Districts:	L. Superior	Other	L. Superior	Other	Ores	—Total—
Eastern	508,978	127,176	13,192	72,791	762,815	1,484,952
Pitts.-Valley	1,145,693	126,098	45,156	271,490	320,965	1,909,402
Cleve.-Detroit	581,038	24,851	82,283	17,157	38,096	743,425
Chicago	1,321,886	(a)	(a)		(a)	1,321,886
Southern	(a)	457,848		(a)	132,180	590,028
Western		434,787				434,787
In U. S.:						
Blast Furnaces	3,016,937	875,535	116,905	254,316	475,951	4,739,644
Steel Furnaces	114,994	61,605	233	3,901	288,312	469,045
Sintering Plants	425,659	233,620	23,493	103,221	489,489	1,275,482
Miscellaneous	5				304	309
Total U. S.	3,557,595	1,170,760	140,631	361,438	1,254,056	6,484,480
In Canada:						
Blast Furnaces	191,713		40,123	49,262		281,098
Steel Furnaces	4,765			7,736	10,618	23,119
Sintering Plants	57,971		2,852	11,607	477	72,907
Miscellaneous	20					20
Total Canada	254,469		42,975	68,605	11,095	377,144
Total U. S.-Canada	3,812,064	1,170,760	183,606	430,043	1,265,151	6,861,624

a—Small tonnage included in other districts to avoid disclosure.
Data from the American Iron Ore Association.

Price Indexes and Composites



Apr. 8, 1958	Week Ago	Month Ago	Mar. Avg	Year Ago
181.6	181.6	181.6	181.6	174.0

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 8

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.135
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.270
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.095
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 9 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	227.41	181.31
Index in cents per lb	6.479	6.479	6.479	6.161	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$145.42	$145.42	$145.42	$139.71	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	64.70	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	64.23	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	65.77	55.77
Steelmaking Scrap, GT	34.17	34.33	36.83	44.00	43.75

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 9 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld Philadelphia	5.725	5.725	5.725	5.365	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.31	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.10	5.10	5.10	5.70	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.975-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.225-5.475
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.49	6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

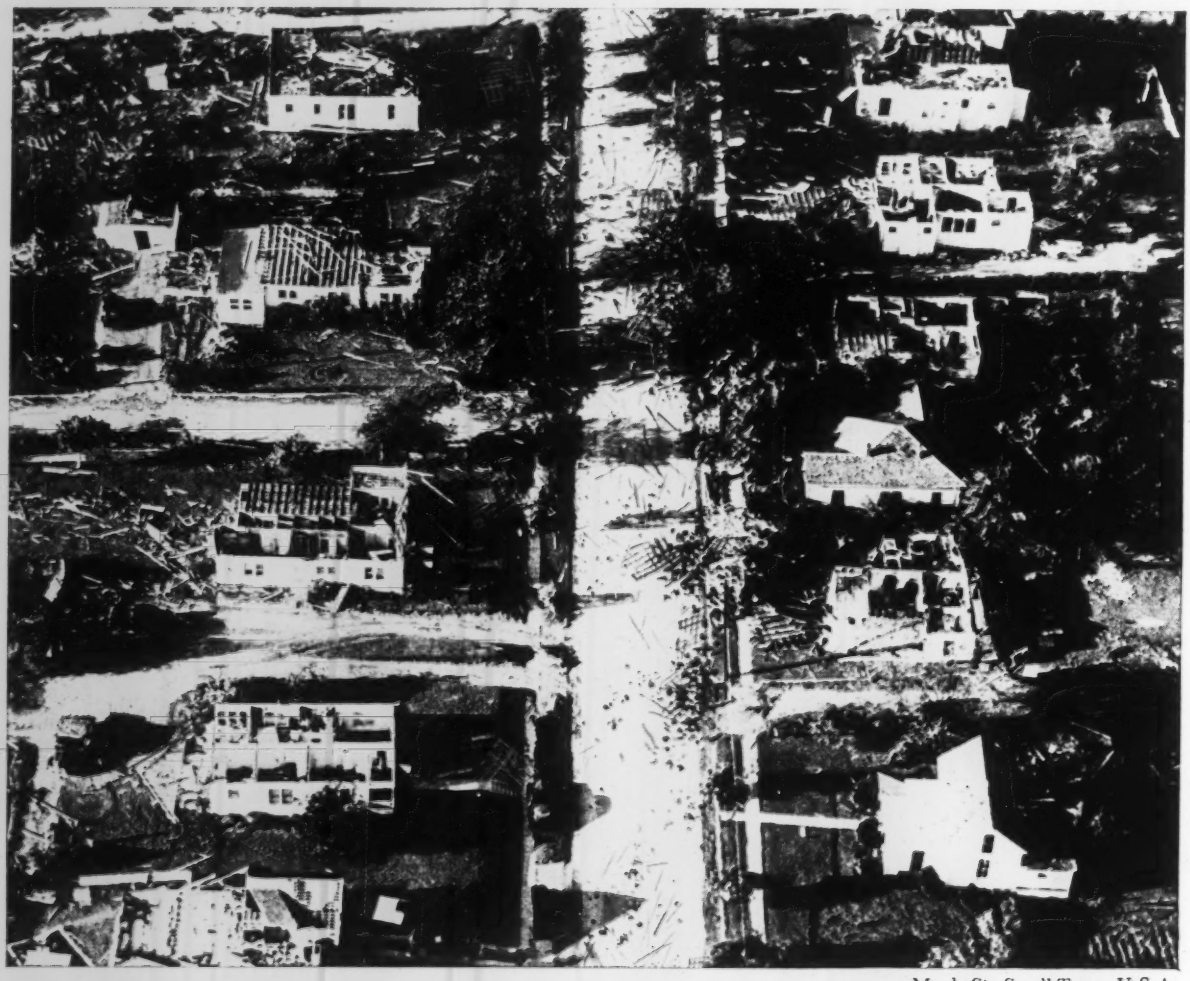
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton	Apr. 9 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$65.50	$55.50
Basic, Valley	66.00	66.00	66.00	64.50	54.50
Basic, deld., Phila.	70.41	70.41	70.41	68.38	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	65.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	65.00	55.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	68.88	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	65.00	55.00
Malleable, Chicago	66.50	66.50	66.50	65.00	55.00
Ferromanganese, Duquesne.	245.00†	245.00†	245.00†	255.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$33.50	$33.50	$36.50	$42.50	$44.00
No. 1 Heavy Melt, E. Pa.	38.00	38.50	38.50	48.50	44.50
No. 1 Heavy Melt, Chicago	31.00	31.00	36.50	41.00	41.50
No. 1 Heavy Melt, Valley	33.50	33.50	37.50	39.50	41.75
No. 1 Heavy Melt, Cleve.	30.50	30.50	33.50	37.00	42.00
No. 1 Heavy Melt, Buffalo	28.50	28.50	28.50	41.50	46.00
Rails, Rerolling, Chicago	53.50	54.50	55.50	54.50	55.00
No. 1 Cast, Chicago	38.50	41.50	41.50	39.50	44.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.00	17.00



Maple St., Small Town, U.S.A.

A TOWN WHERE "NOTHING EVER HAPPENS"...

A home town—like your town. A place where people said "it couldn't happen to us."

But it *did*. Like a whip, a great tornado lashed down Maple Street, splintering houses, leaving people hurt—homeless—panic-stricken.

A desperate call went out for the Red Cross and quickly, automatically, the team went into action.

Red Cross nurses slipped into uniform . . . volunteers set up first aid stations . . . canteens fed the hungry. Later, Red Cross money and work helped rebuild the town.

Last year was one of the worst disaster years of this century, and the year before, 1956, was almost as bad. Every month and in every state, the Red Cross strained to the limit as hurricanes, floods, tornadoes, forest fires swept across the country.

Red Cross receives no government funds—depends entirely upon *you* for support. Give as much as you can. Your dollars may go to your own town when it needs them most.

Join and Serve

SPACE CONTRIBUTED BY STEEL

Steel Prices

Mill prices as reported to STEEL, Apr. 9, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 202; to footnotes, page 204.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B3 .....77.50
Lackawanna,N.Y. B2..77.50
Munhall,Pa. U5 .....77.50
Owensboro,Ky. G8 ....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ...77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3..101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ...105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Owensboro,Ky. G8 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5, W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. C32 .114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 .121.00
Detroit S41 .....114.00
Economy,Pa. B14 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ..114.00
Jonnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2..114.00
LosAngeles B3 .....134.00
Lowellville,O. S3 .....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Owensboro,Ky. G8 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14 .114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ..117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Pittsburgh J5 .....5.075
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P7 .....6.15
N.Tonawanda,N.Y. B11 6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 .....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2..5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 .....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ..5.275
Johnstown,Pa. B2 .....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ....5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ..5.325
Portland,Oreg. O4 .....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ...5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ...5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 .....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 .....6.225
IndianaHarbor,Ind. I-2 5.275
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ..5.325
S.Chicago,Ill. U5 .....5.275
Weirton,W.Va. W6 ....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1.7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 ....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(15) A10 ...5.10
Atlanta A11 .....5.30
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 ....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 .....5.10
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.20
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown U5, Y1 ....5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 ..7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Fontana,Calif. K1 .....8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 .....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.35
Ashland l.c.l.(15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.425
Aliquippa,Pa.(9) J5 ..5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ...5.425
Buffalo(9) R2 .....5.425
Clairton,Pa.(9) U5 ...5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ...5.525
Emeryville,Calif. J7 ...6.175
Fairfield,Ala.(9) T2 ...5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston(9) S5 .....5.675
Ind.Harbor(9) I-2, Y1..5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 .....6.125
Midland,Pa.(23) C18 ..5.725
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(23)B11 5.775
Owensboro,Ky.(9) G8 ..5.425
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.525
Sterling,Ill.(9) N15 ...5.525
Struthers,O.(9) Y1 ...5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5.5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. C32 ...6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 .....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1.6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Owensboro,Ky. G8 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 .....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 ..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14..7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.925
BeaverFalls,Pa. M12...9.925
Camden,N.J. P13 .....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925*
Elyria,O. W8 .....9.925
LosAngeles P2, S30 ..11.40*
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 .....10.10
SpringCity,Pa. K3 .....10.10
Warren,O. C17 .....9.925

*Grade A; add 0.50c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2.7.30
Birmingham C15 .....7.90
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 .....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 ....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles(49) S30 ....8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2, S30 ...10.75
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ....8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 ....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Willimantic,Conn. J5 ..9.075
Worcester,Mass. A7 ...9.075
Youngstown F3, Y1....8.775

BARS, Reinforcing (To Fabricators)

AlabamaCity,Ala. R2 ..5.425
Atlanta A11 .....5.425
Birmingham C15 .....5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Kokomo,Ind. C16 ....5.525
Lackawanna,N.Y. B2..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ..6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2, U8 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Houston S5 .....7.35
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 ....7.10
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ...7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 5.425
ChicagoHts.(4) C2 ...5.425
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O. (3) P11 ...5.325
Tonawanda(3) B12 ..5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa.(3) S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 .....4.925
Conshohocken,Pa. A3..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill.(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 ....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.(19) Ga. & Lighter

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ..10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	..6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.20

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 ..6.60†
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. E6 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60†
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60†
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11....7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O. (28) R2 .....7.425
Youngstown J5 .....7.275
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.625
Cleveland R2 .....6.625
Fairfield,Ala. T2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 .....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 ....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 .....7.00
Niles,O. M21, R2, S3 ...7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W.Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div. Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Div., H. K. Porter Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ...4.925
Atlanta A11 .....4.925
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fontana,Calif. K1 .....5.675
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1.4.925
Johnstown,Pa.(25) B2..4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....5.925
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.Chicago W14 .....4.925
S.SanFrancisco(25) B3..5.675
SparrowsPoint,Md. B2..4.925
Sterling,Ill.(1) N15 ....4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. A2, S3 .....8.10
S.Chicago,Ill. W14 .....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1.7.325
Lackawanna,N.Y. B2 ..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3 .8.075
SparrowsPoint,Md. B2..7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ...7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 .....7.25
Detroit D2, M1, P20 ...7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 .....9.00
FranklinPark,Ill. T6 ...7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford,Mass. R10..7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
NewKensington,Pa. A6..7.15
Pawtucket,R.I. R3 .....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia P24 .....7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y.(32) R6 .....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J.(31) R5 ....8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 .....7.15
Weirton,W.Va. W6 .....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.05
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ...15.05
Harrison,N.J. C18 .....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 .....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ....15.35
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.60
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45
Weirton,W.Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	18.10	....	....
Fostoria,O. S1	...	...	18.30	22.15	....
FranklinPark,Ill. T6	...	...	18.45	22.30	26.65
Harrison,N.J. C18	...	...	18.10	21.95	26.30
New York W3	...	...	18.10	21.95	26.30
Palmer,Mass. W12	...	...	18.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	...	18.10	21.95	26.30
Youngstown J5	...	...	18.45	22.30	26.65

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625*	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10	....	11.35†	12.05	13.15	14.20
					Stator
Vandergrift,Pa. U5	....	....	....	....	7.85

H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	15.00	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	15.25††
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower. ††Coils only.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American 1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Ind.Harb. Y1	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 .....7.95
Ind.Harbor,Ind. I-2, Y1..7.85
Irvin,Pa. U5 .....7.85

Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ....8.60
SparrowsPoint,Md. B2...7.95
Weirton,W.Va. W6 .....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.65
Bartonville,Ill. K4 .....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 .....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ...8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16 ..7.65
N.Tonawanda,N.Y. B11.7.65
Palmer,Mass. W12 .....7.95
Pittsburg,Calif. C11 ....8.60
Portsmouth,O. P12 ....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 .....12.95
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ..9.30
New Haven,Conn. A7 ..9.60
Palmer,Mass. W12 .....9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 .....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16..9.30
MuncieInd. I-7 .....9.50
Palmer,Mass.(12) W12..9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 .....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester A7, J4, T6...9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8.15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 .....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P16 .....15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....15.90
S.SanFrancisco C10 ....16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6 15.90

ROPE WIRE (A)

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 .....13.05
Portsmouth,O. P12 .....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ..12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 .....13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. MS	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.65
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill K4	173
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	173
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) MS	184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$9.10

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. MS	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Houston S5	180
Jacksonville,Fla.(20) MS	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. MS	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. MS	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. MS	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. MS	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
Los Angeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	10.70

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. MS	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. MS	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala T2	212
Houston S5	217
Jacksonville,Fla. MS	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSSTS

Birmingham C15	172
ChicagoHts., Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	172
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. MS	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. MS	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. MS	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. MS	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

	An'ld	Galv.
WIRE (16 gage)	**Stone**	**Stone**
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville K4	17.25	19.05
Cleveland A7	17.15	....
Crawf'dsville MS	17.25	19.05
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville MS	17.50	19.30
Johnstown B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	17.25	18.80†
Minnequa C10	17.40	18.95**
P'im'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37)N15	17.25	19.05††
Waukegan A7	17.15	18.70†
Worcester A7	17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.65	9.20**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	8.75	9.425*
Bartonville(48) K4	8.75	9.425
Buffalo W12	8.65	9.20†
Cleveland A7	8.65	....
Crawfordsville MS	8.75	9.425
Donora,Pa. A7	8.65	9.20†
Duluth A7	8.65	9.20†
Fairfield T2	8.65	9.20†
Houston(48) S5	8.90	9.45**
Jacks'ville,Fla. MS	9.00	9.675
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	8.65	9.20†
Kans.City(48) S5	8.90	9.45**
Kokomo C16	8.75	9.30†
LosAngeles B3	9.60	10.275§
Minnequa C10	8.90	9.45**
Monessen P7(48)	8.65	9.325§
Palmer,Mass. W12	8.95	9.50†
Pitts.,Calif. C11	9.60	10.15†
Rankin,Pa. A7	8.65	9.20†
S.Chicago R2	8.65	9.20**
S.SanFran. C10	9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	8.90	9.575††
Sterling(1) (48)	8.80	9.475††
Struthers,O. Y1	8.65	9.30†
Worcester,Mass.A7	8.95	9.50†

Based on zinc price of: *13.50, †5c, §10c, ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1¼ in. and larger:	
All lengths	35.0

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:

⅛ to ¼ in. incl., 3 in. and shorter	55.0
⅝ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl.) Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
¾ in. and smaller	40.0
⅞, 1 in. and diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞, and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	26.0
¾, ⅞, and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+13.0
¾, ⅞, and 1 in. diam.	+32.0

Flat Head Capscrews:

¾ in. and smaller +76.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter	Net
Longer than 6 in.	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25

⅞ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	....(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary, Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind. Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES

Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.50c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	16.75	0.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	14.75	+1.5	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	3.25	+13	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	15.75	+0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	16.75	0.5	16.75	0.5	....	....	....	....
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
					16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.25
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	62.75
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	62.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	92.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	84.50	89.25	88.50
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	95.25	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.00	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	45.25	52.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	42.00
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	39.75
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.50	49.50	54.50	58.25
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.00	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.10	38.75

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.0475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.285
18.25	4.25	1	4.75	....	....	2.500
18	4	2	9	....	....	2.870
18	4	2	....	....	....	1.960
18	4	1	....	....	....	1.795
9	3.5	..	....	....	....	1.395
13.5	4	3	....	....	....	2.060
13.75	3.75	2	5	....	....	2.440
6.4	4.5	1.9	....	5	....	1.300
6	4	3	....	6	....	1.545
1.5	4	1	....	8.5	....	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.68	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.10	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.10	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	10.20	52.33	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	7.50	8.80	....	....	7.65	7.60	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	7.65	8.45	9.70
Detroit	8.43	9.70	10.45	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	7.10	8.40	8.45	54.32	7.25	7.20	11.10	13.50	7.25	8.05	9.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	9.60	9.40	11.70	57.60	8.55	8.70	12.00	....	8.60	8.55	10.70
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96#	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.23	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.45	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.00	8.90	9.92	52.69	8.70	8.65	11.51#	15.01	8.50	8.75	9.75**
Pittsburgh	8.18	9.45	10.45	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.46	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.71	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	10.95	9.70	11.34#	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.20	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [8]—1000 to 1999 lb; [5]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa. Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa. $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	27.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$11.80-12.00*
Domestic, concentrates f.o.b. milling points	20.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $135 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$50.00
48% 2.8:1	48.00
48% no ratio	39.00

South African Transvaal

48% no ratio	$37.00
44% no ratio	27.00

Turkish

48% 3:1	$55.00

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500-lb drum, freight allowed	
Carlots	39.50
Ton lots	41.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	30.30-45.70†
Bronze, 5000-lb lots	45.70-49.80†
Copper: Electrolytic	14.75*
Reduced	14.75*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.15
Nickel-Silver, 5000-lb lots	47.80-52.60†
Phosphor-Copper, 5000-lb lots	57.80
Copper (atomized) 5000-lb lots	38.30-46.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Dollars	
Melting grade, 99% 60 to 200 mesh, nominal;	
1000 lb and over..	3.15
Less than 1000 lb ..	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.29
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.53	$5.33	$5.33	$5.73
Bar Size Angles	5.73	5.58	5.58	5.99
Structural Angles	5.73	5.58	5.58	5.99
I-Beams	5.88	5.72	5.72	6.02
Channels	5.88	5.72	5.72	6.02
Plates (basic bessemer)	6.79	6.62	6.62	6.94
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.65	6.65	6.65	7.00
Merchant Bars	6.23	6.07	6.07	6.43
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails ($)	8.02	8.02	7.92	8.20

†Per 82 lb. net, reel. $Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton. Palmerton, Neville Island, Pa., 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices. 3c for max 0.03% C, 3.5c for max 0.05% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38.43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.
Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025 max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C, 0.20% max) $3.40.
Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.
65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c, per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c, for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contact, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.
35-40% Zirconium Alloy: Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALICIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c. 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l., bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c; (Small size—weighing approx 2½ lb and containing 1 lb of Si.) Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l., pallets 9.65c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4.25 per lb of contained Cb; less ton lots, $4.30. Delivered.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $3.70 per lb of contained Cb plus Ta, delivered; less ton lot $3.75.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unistage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo., in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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CLEVELAND TRAMRAIL WAY

MODERN buildings not only have more and larger windows than ever before, but because of air-conditioning, they are often non-opening. This necessitates providing some means for reaching them when washing the outsides, and sometimes for the insides also.

Even where provision is made for reaching the outside of a window from the inside, this usually is not desirable when a building is air-conditioned. Open windows quickly unbalance an air-conditioning system, in warm weather and, of course, are undesirable in cold weather.

Cleveland Tramrail Window Washing Equipment offers a solution to the problem. It enables a man to reach every window quickly and wash them with complete safety. In addition, it facilitates other outside building maintenance such as pointing up, painting, minor repairs. The equipment is available for hand or electric operation.

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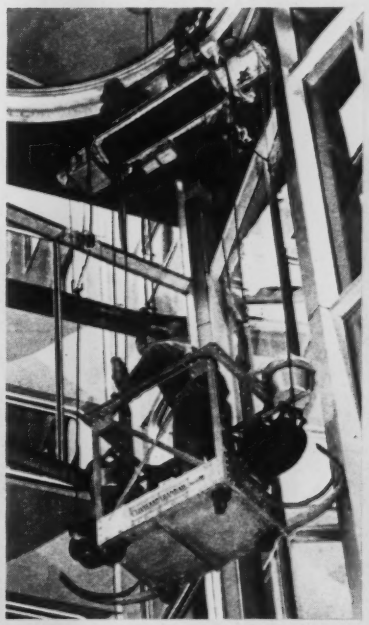
This modern glass-walled office lobby in the super-modern office building of Aluminum Company of America in downtown Pittsburgh is 4½ stories high. Cleveland Tramrail track circles the lobby both outside and inside. A motor-driven carrier and electric hoist is provided for each track loop. When a cage is attached to a carrier, a window washer can position himself at any part of a window by operating the simple hoist and travel controls.



Washing windows on the inside of the lobby. The same cage is used both outside and inside.

Pace of Scrap Decline Slackening

STEEL's composite on the prime grade slips another 16 cents. It now stands at $34.17. Steelmakers are disinterested in tonnage with ingot rate under 50 per cent

Scrap Prices, Page 212

Philadelphia — Brokers' buying prices for electric furnace bundles, structurals and plates, and No. 1 cupola cast are $1 a ton lower. Domestic mill buying is light, and No. 2 heavy melting is expected to slide off with the next sales. Borings and turnings are inactive; their prices are nominal.

Tonnage required for two vessels loading for export at this port has been bought, and most requirements for two ships due to be loaded later this month are also covered. Prices are slightly lower, in line with the trend in the domestic market. Export requirements this quarter are expected to taper off.

New York—Heavy melting steel prices are soft, with brokers lowering their buying prices $1 a ton. No. 2 bundles are quoted $5 to $6 lower, the sharpest decline reported for any grade since the market turned downward. Borings and turnings are off an average of $2, but prices are nominal.

Export inquiry for the second quarter about equals first quarter tonnage. Prices, delivered dock, are down, in line with the range in the domestic market—notably on No. 2 bundles.

Boston—Steel scrap prices in New England are mixed. In effect, there are three bases for No. 1 heavy melting and other steel grades: 1. Eastern Pennsylvania, $25-$26, shipping point, a level too low to attract much tonnage. 2. Worcester, Mass., $29, at which price there is little buying—open hearths at that point are scheduled to close down July 1. 3. Export, $33, dock, with tonnage limited to $4-$5 freight. Export buying is more active; yards within the allowable freight rate are moving the bulk of the tonnage.

Pittsburgh—None of the major consumers in this area is buying, and brokers report April, May, and June prospects are poor. No. 1 railroad heavy melting scrap eased

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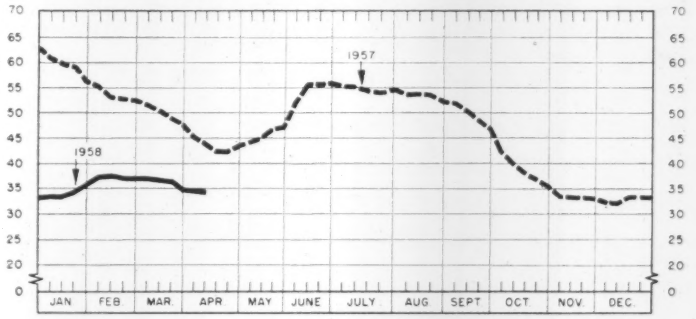
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL.



Apr. 9 1958	Week Ago	Month Ago	Year Ago	Mar. Avg.
$34.17	$34.33	$36.83	$44.00	$35.83

$2 as the Baltimore & Ohio Railroad sold 1400 tons to brokers at $34.30. The B&O sold no scrap in March. Its February selling price for No. 1 heavy melting was $40.85.

Chicago — Steelmaking scrap prices are unchanged, but electric furnace and cast iron grades are off $3 a ton. Blast furnace material is down $1 a ton. The market on cast had held steady for well over a month, principally on the basis of good demand from farm implement foundries. Present weakness results from a general slackening in foundry requirements.

Cleveland—Quoted scrap prices are nominal in the absence of a representative buying test. Brokers describe the market as weak. The district steel rate is bouncing around under the 35 per cent of capacity mark. No market action is anticipated until toward the close of the month when auto lists come out.

Youngstown — The local scrap market continues in the doldrums. There is little chance of any major upturn over coming weeks unless the steel industry snaps out of its slump. Indications are lower prices will be demanded by the mills when they return to the market.

Detroit—Prices are off another dollar or two here, and dealers and brokers think the market will go still lower by the end of the month —some believe the No. 1 grades will be around $15-$16.

A few small buys of foundry scrap were reported last week, but sales at the steel mill level were dull. It looks like the local scrap prices won't advance until the mills start producing steel for the 1959 model automobiles.

Buffalo — A leading consumer placed limited orders for No. 2 heavy melting steel at $26 and No. 2 bundles at $24 for April delivery. It is the first purchases by the mill since January when it paid the same prices for those grades.

The orders have stabilized the local market at prevailing levels. No. 1 heavy melting is continuing at $28-$29.

Cincinnati — The scrap market here is quiet after the downward pressure exerted by mill buying at the start of the month. Except for short shoveling turnings, which moved down $1 a ton to $14-$15, prices are unchanged. District steelmaking operations continue sluggish and show no sign of an early advance.

Birmingham—Local scrap brokers lowered their quotations on most grades last week following announcements by leading consumers that their next purchases would be at prices $1 to $3 a ton under those paid for their last buys. There was no steel mill buying last week, and limited purchases by foundries reflected the lower prices. Dealers have reduced their buying prices. This, in turn, has cut down the flow of material to their yards. The export market is quiet.

St. Louis—Signs of further weakening are noted in the scrap market here. Demand is slow, and prices on many items are off $1 to $2 a ton. Most railroad scrap grades are $2 a ton below what they were a couple weeks ago.

Houston—Scrap demand continues depressed. A modest April purchase by a Texas mill provides the only significant market activity.

San Francisco — Except for the foundry grades, scrap is inactive in this market. No. 1 cupola cast last week was quoted at $42, up $2 a ton.

Los Angeles—Scrap prices are soft in this market, but posted quotations remain unchanged in the absence of a buying test.

Seattle — The better grades of heavy melting steel went up $1 a ton last week, but there was insufficient tonnage moved to test the strength of the market.

Structural Shapes . . .

Structural Shape Prices, Page 201

Seasonal gains in construction should stimulate the movement of structurals over coming weeks. Publicwork, particularly highway and school structures, figures prominently in fabricators' programs for the weeks immdiately ahead. More bridges are being estimated.

In New England, fabricating shops are well covered on their steel needs through the second quarter. This is particularly true of standard shapes. Supply conditions are much the same in other areas of the country, with buyers inclined to order only against needs in sight.

Competition is becoming increasingly keen. Contractors buying fabricated structurals and other building steel are taking full advantage of this and are pressing shops for the lowest possible estimates. More bridgework is being bid on a lump sum basis, including fabricated and erected steel.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6000 tons, elevated structures, J. F. Fitzgerald Expressway, Union Park Street to Massachusetts Avenue with interchange connections, Section P, to the Bethlehem Steel Co., Bethlehem, Pa.; M. DeMatteo Construction Co., Quincy, Mass., is general contractor.

1075 tons, state highway bridges, route 128, Milton-Randolph-Quincy-Braintree, Mass., to the American Bridge Div., U. S. Steel Corp.; Marinucci Bros. & Co. Inc., Boston, is general contractor.

280 tons, junior high school, Farmington, Conn., to the Seymour Steel Products Co., Newington, Conn.; A. F. Peaslee Inc., Hartford, Conn., general contractor; 40 tons of reinforcing bars to the U. S. Steel Supply Div., U. S. Steel Corp., Boston.

200 tons, Moses Lake, Wash., high school, to the Leckenby Structural Steel Co., Seattle.

(*Please turn to Page* 217)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Apr. 9, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 9	$34.17
Apr. 2	34.33
Mar. Avg.	35.83*
Apr. 1957	43.57
Apr. 1953	42.88

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.
*Revised.

PITTSBURGH

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	33.00-34.00
No. 2 bundles	26.00-27.00
No. 1 busheling	33.00-34.00
No. 1 factory bundles	36.00-37.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	19.00-20.00
Cast iron borings	16.00-17.00
Cut structurals:	
2 ft and under	39.00-40.00
3 ft lengths	38.00-39.00
Heavy turnings	28.00-29.00
Punchings & plate scrap	38.00-39.00
Electric furnace bundles	38.00-39.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	44.00-45.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	44.00-45.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	54.00-55.00
Angles, splice bars	*47.00-48.00*
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	100.00-105.00
430 bundles & solids	110.00-115.00
430 turnings	50.00-52.00

CHICAGO

No. 1 hvy melt., indus.	31.00-33.00
No. 1 hvy melt., dealer	29.00-30.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	31.00-33.00
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*17.00-18.00*
Cast iron borings	*17.00-18.00*
Cut structurals, 3 ft	*38.00-39.00*
Punchings & plate scrap	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Stove plate	*45.00-46.00*
Unstripped motor blocks	*30.00-31.00*
Clean auto cast	*45.00-46.00*
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
R. R. malleable	53.00-54.00
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Angles, splice bars	*47.00-48.00*
Axles	*53.00-54.00*
Rails, rerolling	*53.00-54.00*

Stainless Steel Scrap

18-8 bundles & solids	*160.00-165.00*
18-8 turnings	85.00-95.00
430 bundles & solids	90.00-100.00
430 turnings	*45.00-50.00*

YOUNGSTOWN

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	23.00-24.00
No. 1 busheling	33.00-34.00
No. 1 bundles	30.00-34.00
No. 2 bundles	23.00-24.00
Machine shop turnings	10.00-11.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos.	36.00-37.00
Electric furnace bundles	34.00-35.00

Railroad Scrap

No. 1 R. R. heavy melt.	40.00-41.00

CLEVELAND

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	20.00-21.00
No. 1 factory bundles	32.00-33.00
No. 1 bundles	30.00-31.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Machine ship turnings	8.00-9.00
Short shovel turnings	12.00-13.00
Mixed borings, turnings	12.00-13.00
Cast iron borings	12.00-13.00
Cut foundry steel	36.00-37.00
Cut structurals, plates 2 ft and under	39.00-40.00
Low phos, punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Charging box cast	34.00-35.00
Heavy breakable cast	34.00-35.00
Stove plate	43.00-44.00
Unstripped motor blocks	26.00-27.00
Brake shoes	34.00-35.00
Clean auto cast	43.00-44.00
Burnt cast	31.00-32.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	60.00-61.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	50.00-51.00
Cast steel	47.00-48.00
Railroad specialties	49.00-50.00
Uncut tires	41.00-42.00
Angles, splice bars	49.00-50.00
Rails, rerolling	56.00-57.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*32.00*
No. 2 heavy melting	30.00
No. 1 bundles	*32.00*
No. 2 bundles	25.00
No. 1 busheling	33.00
Machine shop turnings	*16.00*
Short shovel turnings	*18.00*

Cast Iron Grades

No. 1 cupola	*44.00*
Charging box cast	33.00
Heavy breakable cast	33.00
Unstripped motor blocks	33.00
Clean auto cast	45.00
Stove plate	*38.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00*
Rails, 18 in. and under	*54.00*
Rails, random lengths	*48.00*
Rails, rerolling	56.00
Angles, splice bars	*47.00*

BIRMINGHAM

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*31.00-32.00*
Cast iron borings	12.00-13.00
Machine shop turnings	24.00-25.00
Short shovel turnings	25.00-26.00
Bar crops and plates	*38.00-39.00*
Structurals & plates	*38.00-39.00*
Electric furnace bundles	*35.00-36.00*
Electric furnace:	
2 ft and under	*34.00-35.00*
3 ft and under	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Stove plate	49.00-50.00
Unstripped motor blocks	*39.00-40.00*
Charging box cast	22.00-23.00
No. 1 wheels	*36.00-37.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	*49.00-50.00*
Rails, random lengths	45.00-46.00
Angles, splice bars	*42.00-43.00*

PHILADELPHIA

No. 1 heavy melting	*38.00*
No. 2 heavy melting	35.00
No. 1 bundles	*38.00*
No. 2 bundles	27.00
No. 1 busheling	*38.00*
Electric furnace bundles	*39.00*
Mixed borings, turnings	18.50†
Short shovel turnings	21.00†
Machine shop turnings	18.50†
Heavy turnings	34.00†
Structurals & plate	*42.00-43.00*
Couplers, springs, wheels	46.00
Rail crops, 2 ft. & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*39.00*
Heavy breakable cast	44.00
Malleable	62.00
Drop broken machinery	50.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*18.00-19.00*
Machine shop turnings	*8.00-9.00†*
Mixed borings, turnings	*10.00-11.00†*
Short shovel turnings	*12.00-13.00†*
Low phos. (structurals & plates	35.00-36.00†

Cast Iron Grades

No. 1 cupola	35.00-36.00
Unstripped motor blocks	28.00-29.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	60.00-65.00
410 sheets, clips, solids	60.00-65.00
430 sheets, clips, solids	75.00-80.00

†Nominal.

BUFFALO

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Mixed borings, turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Short shovel turnings	15.00-16.00
Cast iron borings	14.00-15.00
Low phos. structurals and plate, 5 ft and under	33.00-34.00
2 ft and under	37.00-38.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.00-44.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	37.00-38.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.50-30.50
No. 2 heavy melting	26.50-27.50
No. 1 bundles	29.50-30.50
No. 2 bundles	19.00-20.00
No. 1 busheling	29.50-30.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	*14.00-15.00*
Cast iron borings	11.00-12.00
Low phos. 18 in.	36.00-37.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable cast	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 2 bundles	22.00*
Machine shop turnings	15.00-16.00
Crushed turnings	19.00
Low phos. plates, structurals	37.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable	30.00-31.00*
Unstripped motor blocks	30.00-32.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

*Nominal

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	16.00
No. 1 busheling	*27.00-28.00*
Machine shop turnings	*7.00-8.00†*
Mixed borings, turnings	*7.00-8.00*
Short shovel turnings	*8.00-9.00*
No. 1 cast	29.00-30.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	*33.00-34.00*

†Nominal

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*22.00-23.00*
No. 2 heavy melting	*17.00-18.00*
No. 1 bundles	*24.00-25.00*
No. 2 bundles	*12.00-13.00*
No. 1 busheling	*23.00-24.00*
Machine shop turnings	6.00-7.00
Mixed borings, turnings	7.00-8.00
Short shovel turnings	8.00-9.00
Punchings & plate	29.00-30.00

Cast Iron Grades

No. 1 cupola	*28.00-29.00*
Stove plate	*23.00-24.00*
Charging box cast	22.00-23.00
Heavy breakable	*21.00-22.00*
Unstripped motor blocks	*12.00-13.00*
Clean auto cast	31.00-32.00

SEATTLE

No. 1 heavy melting	*31.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	*25.00*
No. 2 bundles	23.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Electric furnace No. 1	38.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable cast	28.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	21.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	28.00
No. 2 bundles	20.00
Machine shop turnings	9.00
Shoveling turnings	11.00
Cast iron borings	10.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	*42.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

No. 1 heavy melting	32.00
No. 2 heavy melting	28.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Mixed steel scrap	27.00
Mixed borings, turnings	17.00
Busheling, new factory: Prepared	32.00
Unprepared	26.00
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	45.00-50.00

†F.o.b. Hamilton, Ont.

A trainee taught us some ABC's

At a briefing of trainees one of the boys asked: "Can I buy U. S. Savings Bonds through the Company and have my deductions made automatically?" Frankly we had assumed that all of our employees knew all about the Payroll Savings Plan.

As a matter of fact, we've had the Plan in operation here for years. We decided to make sure that *everyone* on our payroll got full information, right away.

Our State Savings Bond Director saw to it that we got a full stock of promotional material to stimulate interest in U. S. Savings Bonds. After that he helped us to conduct a personal canvass and give everyone an application blank.

What happened next was surprising. Our employee participation jumped to a really substantial percentage. When our people had all the facts they were glad to gain the security that U. S. Savings Bonds offer them.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTIC DONATION, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Prices Firm for Moment

Lead, zinc, and copper have sales and production problems, but primary prices look stable for time being. Custom-smelted copper lowered to 23½ cents per pound

Nonferrous Metal Prices, Pages 216 & 217

THE RECENT 1 cent a pound slash in lead has posed two questions: 1. Will a decline in zinc follow? 2. Will the lead price go any lower?

Answer—The consensus in nonferrous circles is a "cautious no" to both. Metalmen point out that although zinc sales are weak, a price cut would have little effect on demand.

They also say that zinc, unlike lead, hasn't been out of line with foreign quotations.

Observers say it's surprising that the lead price held up as long as it did. Probable reasons: 1. A number of barter deals were pending. 2. Many producers were anticipating a decision of the Tariff Commission.

What probably triggered the slash was rising stocks of concentrates in the hands of custom smelters.

While the lower price probably won't stimulate sales, it makes domestic metal more competitive with imports in certain areas. At current (Apr. 8) London Metal Exchange quotations, foreign lead can be obtained in New York at 10.86 cents a pound (including duty and ocean freight). But it costs an additional penny a pound to ship to the Midwest where the domestic common lead price is competitive at 11.80 cents a pound.

This should help firm the present price.

Too Much—Now that the lead and zinc stockpiles are virtually at an end, metalmen will have to do something to keep stocks from going sky high. Short term solution: More production curtailments. (It's rumored that heavy cutbacks have been underway for some time and more are to come.)

Some observers believe the long term solution to both stocks and prices might lie in tariff legislation. Says Andrew Fletcher, president of St. Joseph Lead Co.: "We do not want tariff barriers, but we do want adequate controls against floods of unneeded imports." Mr. Fletcher suggests a tax be placed on lead and zinc imports when prices fall below 17.5 cents a pound (lead) and 14.5 cents (zinc).

Titanium Price Down

New sponge prices read: $2.05 a pound for A-1 ductile (down 20 cents); $1.85 a pound for A-2 (down 15 cents).

Aluminum: New Pattern?

"The 24 cent a pound price on aluminum proves U. S. output is now in a world market and has to react like other metals to overseas supply-demand-price conditions," says one metalman. Many observers are beginning to believe that to some extent the U. S. price will be determined by prices in other countries. They point out this latest drop was partially occasioned by Aluminium Ltd. having to drop prices on a worldwide basis to meet competition from Russian metal imported by the United Kingdom.

Aluminium denies that explanation and says it lowered the price to stimulate demand.

U. S. producers still aren't happy about the cut. One source points out more sales could be made if the 2 cents were put into market development and research rather than operating on a theory that "the lower the price, the greater the sales."

Copper Labor Troubles

A wage dispute has halted output at Anaconda Co.'s Chuquicamata (Chile) mine. Loss of its 20,000 ton a month output will be a blow to Europe, already suffering from a shortage of some copper items.

Domestically, the market's quiet. Evidently customers filled April requirements in the buying flurry several weeks ago. This slackening in demand with the resultant rise in concentrates has caused custom smelters to lower their price 0.5 cent to 23.5 cents a pound. The primary price remains firm at 25 cents a pound.

Moly Production Up

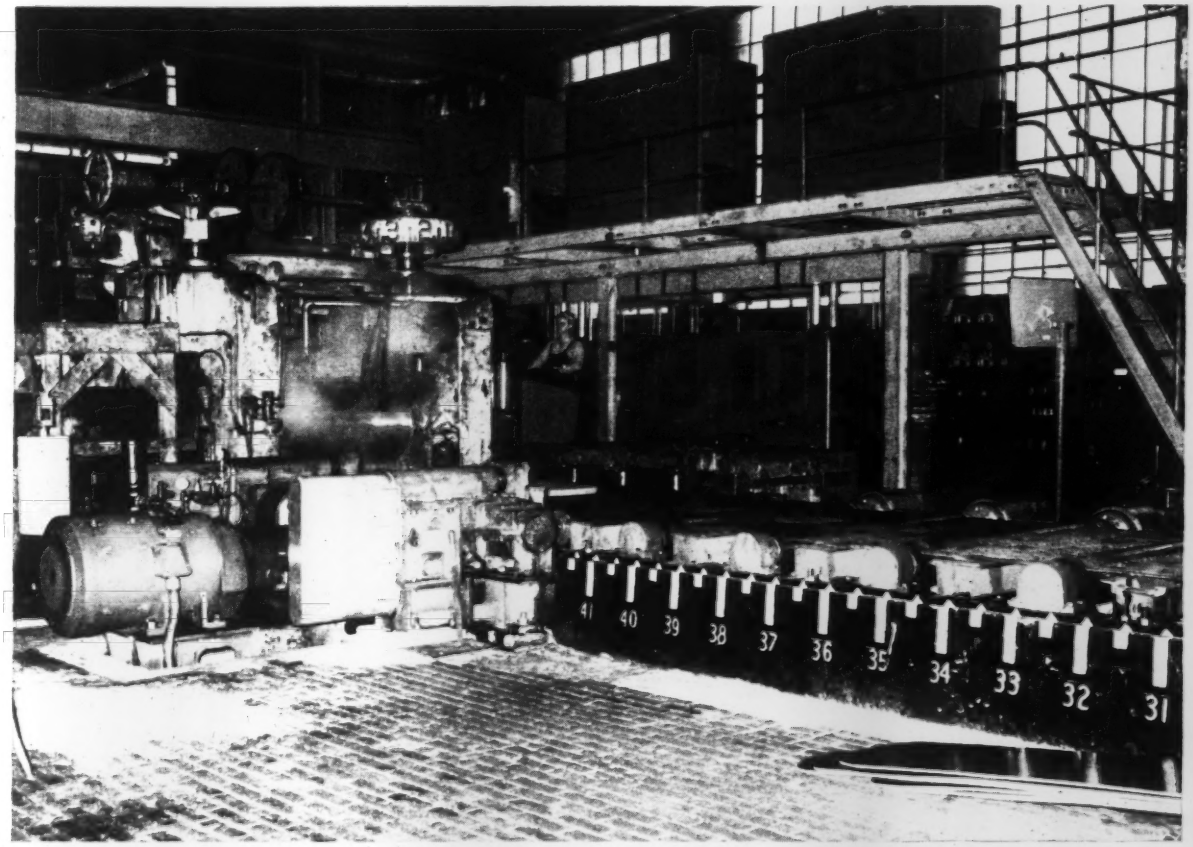
Domestic production of molybdenum scored its second best year in 1957 at 60.8 million lb. Shipments, including exports, were up also, totaling 57.2 million lb, compared with 57.1 million lb in 1956. But consumption fell to 39.0 million lb, 7.7 million lb under the 1956 mark. Two reasons: 1. A four-month strike in the industry. 2. The general falloff in the economy.

The biggest industry customer is Detroit, which takes the metal for alloying applications. (About 89 per cent is used as alloying agent, 4 per cent as a metal, and 7 per cent in chemicals.)

NONFERROUS PRICE RECORD

	Price Apr. 9	Last Change		Previous Price	Mar. Avg	Feb. Avg	Apr., 1957 Avg
Aluminum	24.00	Apr.	1, 1958	26.00	26.000	26.000	25.000
Copper	23.50–25.00	Apr.	8, 1958	24.00–25.00	24.163	24.298	31.598
Lead	11.80	Apr.	1, 1958	12.80	12.800	12.800	15.800
Magnesium	35.25	Aug.	13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec.	6, 1956	64.50	74.000	74.000	74.000
Tin	93.25	Apr.	9, 1958	92.50	93.425	93.818	99.276
Zinc	10.00	July	1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.



Packaged M-G sets and controls are located right at the hot mill in Revere Copper and Brass, Incorporated's New Bedford, Mass. plant

Reliance Packaged Drives cut Modernization Cost 20%

Instead of one large motor-generator set, Revere Copper and Brass, Incorporated used five packaged V★S Drives to power the edger and tables on their rebuilt hot mill.

Reliance Drives package the M-G sets with controls and put them right at the mill itself. Conduit runs are of minimum length, which reduced not only material costs but construction time.

Control installation was vastly simplified. Each V★S Unit was prewired and pretested before shipping. The complete V★S Cabinets had only to be set in place and connected. Extra construction was not required for a generator room.

Packaged V★S Drives cut costs for Revere and gave more flexibility of operation and greater ease of maintenance. Reliance Packaged Drives will reduce drive installation and operating costs for any type of mill.

For complete details contact your Reliance representative, or write today for Bulletin No. D-2506. L-1586

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 44A, CLEVELAND 17, OHIO
CANADIAN DIVISION: TORONTO, ONTARIO
Sales Offices and Distributors in principal cities

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.00; ingots, 26.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 27.90; No. 43, 27.70; No. 195, 28.70; No. 214, 29.50; No. 356, 27.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 23.50-24.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-90 per lb, nom.

Copper: Electrolyic, 25.00 deld.; custom smelters, 23.50; lake, 25.00 deld.; fire refined, 24.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-90 nom. per troy oz.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. thick, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $232-237 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 779.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $70-100 per troy oz nom.

Palladium: $19-21 per troy oz.

Platinum: $68-75 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 88.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 93.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.05; grade A-2 (0.5% Fe max.), $1.85 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.85.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.00; special high grade, 11.25 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.75; No. 5, 14.25 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00-24.50; No. 12 foundry alloy (No. 2 grade), 21.25-21.50; 5% silicon alloy, 0.60 Cu max., 24.00-24.25; 13 alloy, 0.60 Cu max., 24.00-24.25; 195 alloy, 24.25-25.50; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 21.25; grade 3, 20.00; grade 4, 18.00.

Brass Ingot: Red brass, No. 115, 25.25; tin bronze, No. 225 34.00, No. 245, 28.75; high-leaded tin bronze, No. 305, 29.25, No. 1 yellow, No. 405, 20.75; manganese bronze, No. 421, 23.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.78, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 30.355; l.c.l., 30.98. Weatherproof, 30,000-lb lots, 32.53; l.c.l., 33.28. Magnet wire deld., 38.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, $24.00; plate, $12.50-19.20; H.R. strip, $12.50-22.90; $11.00-17.40.

ZIRCONIUM

C.R. strip, $15.00-31.25; forged or H.R. bars, ribbon zinc in coils, 20.50; plates, 19.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.009½	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	41.70	46.50
5050-F	42.80	47.60
3004-F	43.80	49.50
5052-F	44.40	50.20
6061-T6	44.90	51.00
2024-T4	48.60	55.40
7075-T6*	56.40	64.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, random lengths, diam. 0.688-8 in., "F" temper: 2014, 41.50-54.30; 6061, 40.90-54.30; 7075, 42.90-56.30; 7079, 43.40-56.80.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
width; .125 in., 74.90; .188 in.,		71.70-72.70;
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 12.00-12.50; old sheets, 9.00-9.50; borings and turnings, 5.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.13b	45.36c	....	48.32	21.000	21.000	20.250
Yellow Brass	42.69	31.03d	43.23	45.60	16.125	15.875	14.500
Low Brass, 80%	44.90	44.84	45.44	47.71	17.875	17.625	17.125
Red Brass, 85%	45.67	45.61	46.21	48.48	18.625	18.375	17.875
Com. Bronze, 90%	46.98	46.92	47.52	49.54	19.250	19.000	18.500
Manganese Bronze	50.81	44.91	55.44	....	14.875	14.625	14.125
Muntz Metal	45.19	41.00	....	....	15.125	14.875	14.375
Naval Brass	47.07	41.38	54.13	50.48	14.875	14.625	14.125
Silicon Bronze	52.84	52.03	52.88	54.77	20.625	20.375	19.625
Nickel Silver, 10%	57.93	60.26	60.26	....	21.125	20.875	10.562
Phos. Bronze, A-5%	67.17	67.67	67.67	68.85	21.875	21.625	20.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

5.50; crankcase, 9.00-9.50; industrial castings, 9.00-9.50.

Copper and Brass: No. 1 heavy copper and wire, 17.25-17.75; No. 2 heavy copper and wire, 15.50-15.75; light copper, 13.25-13.75; No. 1 composition red brass, 14.50-15.00; No. 1 composition turnings, 13.50-14.00; new brass clippings, 13.00-13.50; light brass, 8.00-8.50; heavy yellow brass, 10.00-10.50; new brass rod ends, 11.00-11.50; auto radiators, unsweated, 11.00-11.50; cocks and faucets, 12.00-12.50; brass pipe, 12.00-12.50.

Lead: Heavy, 7.50-8.00; battery plates, 2.75-3.00; linotype and stereotype, 9.75-10.25; electrotype, 9.00-9.50; mixed babbitt, 10.50-11.00.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 15.50-16.25; 3003 clippings, 15.50-16.25; 6151 clippings, 15.50-16.50; 5052 clippings, 15.00-15.75; 2014 clippings, 15.00-15.25; 2017 clippings, 15.00-15.25; 2024 clippings, 15.00-15.25; mixed clippings, 14.00-14.75; old sheets, 11.50-12.25; old cast, 11.50-12.25; clean old cable (free of steel), 14.50-15.25; borings and turnings, 12.00-13.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire, 20.00; No. 2 heavy copper and wire 18.00; light copper, 15.75; refinery brass (60% copper) per dry copper content, 17.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 20.00; No. 2 heavy copper and wire, 18.00; light copper, 15.75; No. 1 composition borings, 17.25; No. 1 composition solids, 17.75; heavy yellow brass solids, 12.25; yellow brass turnings, 11.50; radiators, 13.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quanties)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 41.79; oval, 40.00, 5000-10,000 lb; electrodeposited, 31.25, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 16.00; flat tops, 16.00; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 68.40; 300-900 lb, 66.40; 1000-19,900 lb, 64.40.

Copper Sulphate: 100-1900 lb, 13.70; 2000-5900 lb, 11.70; 6000-11,900 lb, 11.45; 12,000-22,900 lb, 11.20; 23,000 lb or more, 10.70.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400-999 lb, 43.50; 10,000 lb or more, 40.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 2000-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 211)

150 tons, ship channels, General Stores Supply, Navy, Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Bellevue Safeway warehouse, and Seattle school contracts, to the Leckenby Structural Steel Co., Seattle.

125 tons, medical building, University of Vermont, Burlington, Vt., to the Builders Iron Works, Somerville, Mass.; J. Slotnick Co., Boston, general contractor; 70 tons of reinforcing bars to the Vermont Structural Steel Co., Burlington, Vt.

100 tons, junior high school, Arlington, Va., to the Southern Iron Works, Washington. Eugene Simpson Co., Alexandria, Va., is general contractor.

STRUCTURAL STEEL PENDING

12,000 tons, including extensions, also 660 tons of reinforcing bars, 310-mile 230-kv transmission line, Ft. Peck to Bismarck, N. Dak.; Lipsett Inc., Sioux Falls, S. Dak., low at $5,252,070 to the Bureau of Reclamation, Bismarck, N. Dak.

1000 tons, five state highway bridges, Middleboro, Mass.; bids Apr. 22, Boston.

1000 tons or more, 21-story Metropolitan Center buildings and postoffice, Seattle; separate bids for structurals mid-May to University Properties, Seattle.

900 tons, Oregon-Idaho Snake River bridges, twin, 968 ft each; Hoffman Construction Co., Portland, Oreg., low at $720,492.

800 tons, garage and addition, National Bank of Commerce, Seattle; general contract to Cawdrey & Vemo, Seattle.

600 tons, six state highway bridges, Wilmington, Mass.; bids Apr. 15, Boston.

370 tons, Washington State, plate girder underpass, Pierce County; general contract to Richard L. Martin, Oswego, Oreg., low at $225,605.

285 tons, Washington State, railroad underpass, Chelan County; general contract to Henry Hagman, Spokane, Wash., low at $359,884.

245 tons, bridge, state highway 80 over Broadway, Bangor, Maine.

200 tons, 4-span stringer bridge, Hingham-Weymouth, Mass.; B. J. Pentabone Inc., Newton, Mass., is low on the general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

700 tons, dormitory, "Eighth House," Harvard University, Cambridge, Mass., to the Concrete Steel Co., Boston; George A. Fuller Co., Boston, general contractor.

500 tons, estimated, seven Long Island Railroad grade crossing structures, Freeport, N. Y., to the Bethlehem Steel Co., Bethlehem, Pa., and Carroll-McCreary Steel Co., Brooklyn, N. Y.; Hendrickson Bros. Inc., Valley Stream, N. Y., general contractor.

REINFORCING BARS PENDING

1175 tons, runway, three aprons, pipelines, etc., Glasgow, Mont. Air Base; bids to the U. S. Engineer, Walla Walla, Wash., about May 15.

500 tons (estimated), 9-story Sheraton Hotel, Lloyd Center, Portland, Oreg.; general contract to Hoffman Construction Co., Portland.

300 tons, Snake River twin bridges, Oregon-Idaho; Hoffman Construction Co., Portland, Oreg., low.

300 tons, Oregon-Idaho Snake River bridges; Hoffman Construction Co., Portland, Oreg., low.

210 tons, Glendale Dam, Cambria County, Pennsylvania; bids Apr. 10, Harrisburg, Pa.

192 tons, Washington State, four bridges, Adams County; general contract to Erickson Paving Co., Bellevue, Wash., low at $804,274.

160 tons, Montana State overpass, Beaverhead County; general contract to W. R. Cahoon Construction Co., Pocatello, Idaho, at $213,007.

150 tons, ammunition magazine, Geiger Air Base, Spokane, Wash.; general contract to P.&B. Co. Inc., and Warner & Brown Inc., joint low at $700,821, by the U. S. Engineer, Seattle.

140 tons, Washington State, flat slab bridge, Lincoln County; Rund Construction Co., Spokane, Wash., low at $115,975.

110 tons, bridge-dam, Watauga County, Boone Fork Creek, N. C.; bids Apr. 22, to the Bureau of Roads, Arlington, Va.

CLASSIFIED ADVERTISING

OVERHEAD CRANE
1 SHAW BOX 15 Ton 100' Span
1 P & H 15 Ton 100' Span
1000' Runway A-Frame Mounted
25' Clearance
230 DC Volts. Photographs Available.
GEORGE D. KAPLAN LTD.
801 Bond Street, Elizabeth, N. J.
EL. 2-4216

Help Wanted

EXPERIENCED MISCELLANEOUS AND ORNAMENTAL iron estimator or detailer to take complete charge of drafting department, including all purchasing and expediting. Please give complete resume of experience, age, and salary expected in first reply. Write Box 648, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

METHODS ENGINEER
29 year's experience with top manufacturer in all phases of steel fabricating. Know set-up procedures, how to estimate time, and have designed dies, weld fixtures. Seeking Industrial Engineer position with steel fabricator. Write Box 651, STEEL, Penton Bldg., Cleveland 13, Ohio

METALLURGICAL CONSULTANT
Available for Melt Shop Problems in technical and customer service. Broad industrial experience in all processes for carbon, low and high alloy iron and steelmaking. Box 640, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXECUTIVE ENGINEER—20 years of diversified experience in Financial, Sales, Engineering and Production in the metal industry—large appliances, environmental test equipment & heavy fabrication. Write Box 655, STEEL, Penton Bldg., Cleveland 13, Ohio.

MACHINE TOOL SALESMEN WANTED
Country-wide opportunity to represent leading machinery firm in sale of extensive line of new equipment and/or used. Only apply if you have top sales record. Send all details first letter. Correspondence confidential. Write: L. D. Srybnik, **S & S Machinery Company**, 140 - 53rd Street, Brooklyn 32, New York.

SALES REPRESENTATION
Wanted: Nationally known Electric Welded Steel Tube Producer has opening for sales representative in southeastern states.
Write: Box No. 652, STEEL.
Penton Bldg. Cleveland 13, Ohio

HELP WANTED
Man in $10,000-$15,000 yearly class to operate 54" cupola for tonnage in alloy pig. Mechanical and business ability to purchase and prepare scrap and alloys required.
Write Box 654, STEEL
Penton Bldg. Cleveland 13, Ohio

SALES REPRESENTATION
Wanted: Nationally known Electric Welded Steel Tube Producer has opening for sales representative in Oklahoma and **Texas** area.
Write: Box No. 653, STEEL
Penton Bldg. Cleveland 13, Ohio

Magnetic-Core Coil Classifier Inspects Tin Plate Continuously, Automatically

Beckman coil classifiers are measuring and recording characteristics and defects of tin plate around-the-clock, in continuous on-line operation. Linear travel, pinhole footage, over- and under-gage tolerances, coatings, quenching strain, slivers, abrasions, damaged edges are all detected and recorded while coils are rolling and shears flying.

Data from detectors is supplemented by manual entries showing date, purchase order, coil, line, and turn numbers. All information is then delayed for correct relationship to shear position. Upon shear activation, the appropriate totalized data is recorded on preprinted formats, with separate records for quality control and customer information. This in-process correlation of upstream detection with shear control and data printout permits accurate profiling of product with no lag in production – increases profit margins.

No vacuum tubes are used – all electronic circuitry consists of extremely reliable, toroidal magnetic cores and other passive elements. Without modification, Beckman coil classifiers are compatible with data reduction systems and in-process control.

Coil classifiers are typical of the many reliable system applications of Beckman counters and timers, proved in thousands of field installations. For more information on counting and timing system applications, write for Data File 4D-13-67.

Beckman®

Systems Division

325 N. Muller Ave., Anaheim, Calif.
a division of Beckman Instruments, Inc.

Responsible new positions in engineering, manufacturing, technical marketing. Write for Career File 10

Advertising Index

Aeroquip Corporation 112
Alco Products, Inc. 11
Allegheny Ludlum Steel Corporation 117
Allied Research Products, Inc. 188
Allis-Chalmers 177
Almco Queen Products, Inc. 81
American Brake Shoe Co., Electro-Alloys Division 52
American Brake Shoe Co., National Bearing Division 170
American Optical Co., Safety Products Division 44
American Schiess Corporation, Engineering Division 31
American Steel & Wire Division, United States Steel Corporation 32, 33
American Steel Warehouse Association, Inc. 66
American Waldrich Mfg. Corporation 30
Anaconda Wire & Cable Co. 169
Apex Machine & Tool Co. 10
Armco Steel Corporation 82
Associated Spring Corporation, Wallace Barnes Steel Division 64

Babcock & Wilcox Co., The, Refractories Division 155
Baldwin-Lima-Hamilton Corporation, Standard Steel Works Division 36
Barber-Colman Co. 172, 173
Barnes, Wallace, Steel Division, Associated Spring Corporation 64
Bay State Abrasive Products Co. 62, 63
Beckman Systems, A Division of Beckman Instruments, Inc. 218
Behr-Manning Co., A Division of Norton Co. 55, 56
Bethlehem Steel Co. 1, 220
Birdsboro Steel Foundry & Machine Co. 57
Blaw-Knox Co., Foundry & Mill Machinery Division 65
Bliss & Laughlin, Inc. 196
Bliss, E. W., Co., Rolling Mill Division 17
Bower Roller Bearing Division, Federal-Mogul-Bower Bearings, Inc. 175
Bristol Brass Corporation, The 58
Buffalo Forge Co. 74
Bullard Co., The 98
Byers, A. M., Co. 51

Cadman, A. W., Mfg. Co. 210
Cameron Iron Works, Inc. 75
Carpenter Steel Co., The 118, 119
Cattie, Joseph P., & Brothers, Inc. 210
Century Electric Co. 9
Cincinnati Gear Co., The 120
Cleveland Hotel 186
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 209
Cleveland Worm & Gear Co., The Inside Back Cover
Colorado Fuel & Iron Corporation, The 45, 114, 115
Columbia-Geneva Steel Division, United States Steel Corporation 32, 33
Copperweld Steel Co., Steel Division 101
Copperweld Steel Co., Superior Steel Division 165
Cullen-Friestedt Co. 192
Cutler-Hammer, Inc. Back Cover

Dana Corporation, Parish Pressed Steel Division 109
De Laval Steam Turbine Co. 37
Disston Division, H. K. Porter Company, Inc. 193
Dreis & Krump Manufacturing Co. 46

Eaton Manufacturing Co., Dynamatic Division 162
Electric Controller & Mfg. Co., The, A Division of The Square D Co. Inside Front Cover
Electro-Alloys Division, American Brake Shoe Co. 52
Electro Dynamic Division of General Dynamics Corporation 116
Electro Metallurgical Co., Division of Union Carbide Corporation 39

Ex-Cell-O Corporation ... 6
Ex-Cell-O Corporation, Machinery Division ... 7

Federal-Mogul-Bower Bearings, Inc., Bower Roller Bearing Division ... 175
Federal Products Corporation ... 23
Fellows Gear Shaper Co., The ... 179
Fenn Manufacturing Co., The ... 122
Filmsort Co., The, A Division of Miehle-Goss-Dexter, Inc. ... 104
Formed Tubes, Inc. ... 16

Garlock Packing Co., The ... 61
Gates Rubber Co., The ... 195
General American Transportation Corporation, Parker-Kalon Division ... 28
General Dynamics Corporation, Electro Dynamic Division ... 116
General Refractories Co. ... 53
Gerlinger Carrier Co. ... 43
Gisholt Machine Co. ... 18
Great American Industries, Inc., Rubatex Division ... 12

Hamilton Foundry & Machine Co., The ... 147
Handy & Harman ... 156
Harbison-Walker Refractories Co. ... 148, 149
Harnischfeger Corporation ... 158, 159
Harrington & King Perforating Co., Inc., The ... 194
Heppenstall Co. ... 143
Hevi-Duty Electric Co. ... 174
Hill Acme Co., The ... 71
Hoover Ball & Bearing Co. ... 67
Houghton, E. F., & Co. ... 102
Hyde Park Foundry & Machine Co. ... 219
Hydraulic Press Mfg. Co., The, A Division of Koehring Co. ... 24

Indiana Steel & Wire Co., Inc. ... 210
Inland Steel Co. ... 151
Ingersoll-Rand ... 176

Jones & Laughlin Steel Corporation, Stainless Steel Division ... 69

Kaplan, George D., Ltd. ... 217
Kling Brothers Engineering Works ... 3
Koehring Co., The Hydraulic Press Mfg. Co. Division ... 24

Landis Tool Co. ... 13
Leeds & Northrup Co. ... 47
Littell, F. J., Machine Co. ... 171

McKay Machine Co., The ... 93

Magnaflux Corporation ... 166
Manning, Maxwell & Moore, Inc., Shaw-Box Crane & Hoist Division ... 146
Marchant, Geo. F., Co. ... 192
Memphis Industrial Development Committee, Memphis & Selby County Port Commission ... 123
Metal Treating Institute ... 8
Miehle-Goss-Dexter, Inc., The Filmsort Co. Division ... 104
Minnesota Mining & Manufacturing Co. ... 35
Monarch Machine Tool Co., The ... 76
Morse Twist Drill & Machine Co. ... 48, 49

National Automatic Tool Co., Inc. ... 68
National Bearing Division, American Brake Shoe Co. ... 170
National Steel Corporation ... 19
Nilson, A. H., Machine Co., The ... 124
Norton Co. ... 26, 27
Norton Co., Behr-Manning Co. Division ... 55, 56

Ohio Ferro-Alloys Corporation ... 134

Pangborn Corporation ... 153
Parish Pressed Steel Division of Dana Corporation ... 109
Parker-Kalon Division, General American Transportation Corporation ... 28
Pittsburgh Engineering & Machine, Division of Pittsburgh Steel Foundry Corporation ... 145
Porter, H. K., Company, Inc., Disston Division ... 193
Potter & Johnston Co. ... 184, 185
Pratt & Whitney Co., Inc. ... 180, 181, 182, 183

Ready-Power Co., The ... 168
Reliance Electric & Engineering Co. ... 215
Republic Steel Corporation ... 20, 21
Revere Copper & Brass, Inc. ... 70
Rockford Machine Tool Co. ... 40, 41
Roebling's, John A., Sons Corporation, A Division of The Colorado Fuel & Iron Corporation ... 45
Royal McBee Corporation ... 133
Rubatex Division, Great American Industries, Inc. ... 12
Ryerson, Joseph T., & Son, Inc. ... 84

Sandvik Steel, Inc. ... 34
Scottish Tool, Die & Metal Products Co. ... 210
Sharon Steel Corporation ... 121
Shenango Furnace Co., The, Centrifugally Cast Products Division ... 167
Signode Steel Strapping Co. ... 60
Simonds Abrasive Co., Division of Simonds Saw & Steel Co. ... 111
Simonds Saw & Steel Co. ... 190
SKF Industries, Inc. ... 2
Smith, A. O., Corporation, Welding Products Division ... 14, 15
Square D Co., The, The Electric Controller & Mfg. Co. Division ... Inside Front Cover
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation ... 36
Superior Steel Division of Copperweld Steel Co. ... 165
Surface Combustion Corporation ... 94

Tennessee Coal & Iron Division, United States Steel Corporation ... 32, 33
Texas Co., The ... 78
Thomas Flexible Coupling Co. ... 178
Tinnerman Products, Inc. ... 106
Towmotor Corporation ... 43

Union Carbide Corporation, Electro Metallurgical Division ... 39
United Engineering & Foundry Co. ... 187
United States Steel Corporation, Subsidiaries ... 32, 33, 72, 73
United States Steel Export Co. ... 32, 33
Universal-Cyclops Steel Corporation ... 22

Virginia Electric & Power Co. ... 50

Washburn Wire Co. ... 25
Washington Steel Corporation ... 4
Waterbury Farrel Foundry & Machine Co. ... 38
Wean Equipment Corporation ... 29
Weirton Steel Co. ... 19
West Penn Power, Area Development Department ... 59
Wheland Co., The ... 104
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation ... 114, 115
Williams, J. H., & Co. ... 105

Table of Contents, Page 5

Classified Advertising, Page 217

RED CIRCLE
Rolls
ALLOY-CHILLED
Hyde Park
Rolling Mill Equipment
For more than 50 years Hyde Park Steel Mill equipment has been helping American industry lead the world — equipment such as—
• Bar Mills
• Merchant Mills
• Sheet and Strip Mills
• Pinion Stands
• Roller Tables
• Reduction Drives
• Stretcher Levellers
• Guillotine Shears
• Sheet Mill Shears
• Roll Lathes
• Special Machinery
• Machine Work
For finer finish, long life and greater tonnage, specify Red Circle Rolls.
Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland Co., Pa.
ROLLS
ROLLING MILL MACHINERY
GRAY IRON CASTINGS

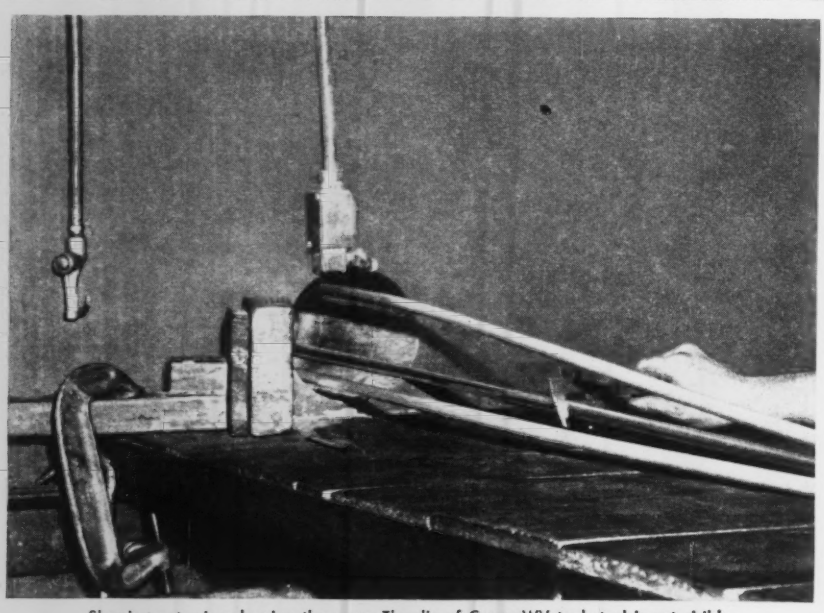
Tool Steel Topics

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation



Showing extrusions leaving the press. The die of Cromo-WV tool steel is not visible.

Die made from Cromo-WV passes tough extrusion test

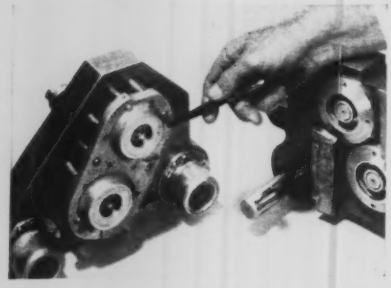
Quality plus economy — that's the kind of a die steel they needed at American Aluminum Extruders, Miami, Fla., to produce aluminum extrusions used as decorative trim. Our local tool steel distributor, J. M. Tull Metal & Supply Co., Inc., recommended Bethlehem Cromo-WV.

"We've had a lot of experience with this grade," they said. "Give it a try, and the performance figures will speak for themselves."

That's just the way it turned out. Cromo-WV was satisfactory in every way. Hardened to Rockwell C-47, the die extruded about 2,500 lb of aluminum before polishing was required.

Cromo-WV, in addition to its 5 pct chrome, contains .30 pct vanadium. It is a modification of our popular Cromo-W, the original 5 pct chrome hot-work steel. Like Cromo-W, it combines red hardness, shock resistance, and resistance to heat-checking. It is an ideal grade for extrusion work.

Your Bethlehem tool steel distributor will be pleased to supply Cromo-WV, whether you want a production quantity or just enough to give it a trial.



IT'S TOPS FOR BOTTLE CAPS

Here's a die made of BTR (Bethlehem Tool Room) which was used in producing millions of tinplate bottle caps. The die was hardened to Rockwell C-61, and was redressed about every third month. BTR is our general-purpose manganese-chromium-tungsten grade of oil-hardening tool steel. Tough, and safe-hardening, you can count on it for extremely long wear.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

In Machining Operations, Chips Tell a Story

A good way to evaluate a machining operation is to examine the chips carefully. This step is particularly valuable in operations where large amounts of metal are removed at high speed.

Generally, the color and shape of the chips tell a story which, when properly interpreted, can lead to improvements in the operation. For example, when machining with high-speed steel tools, the chips produced should show some temper color (yellow or brown). If they do not, it means that speed and feed might be increased greatly, boosting the production rate on the machine. When machining with carbide or ceramic tools, the chips should always be highly temper-colored (purple or blue). If otherwise, you are probably "under-machining."

The shape of the chips will vary with the type of steel being machined, but comparison of chip shape under varying conditions may provide valuable information. The ideal chip shape, indicating ideal machining conditions, is like the letter "C." Often the "C" can have a decided flourish, but this form of chip (on steel) is best. Generally, the secret of producing "C" chips lies in the proper balance of feed and depth of cut, versus speed. These factors should be varied whenever other types of chips are produced, to develop the best machining conditions.

Examination of chip shape is also of value for control purposes. For example, if "C" chips are being produced in a machining operation, and they become gradually longer or stringy, it indicates the tool is becoming dull, and requires resharpening.

It is difficult to establish more specific rules which apply to all machining operations, due to their variety and complexity. However, you can be sure that the proper control of chip color and shape will pay off in increased production.

View of the huge Cleveland Worm and Gear set used in this 150 Series All-Steel Shear, built by The Cincinnati Shaper Co.

CLEVELAND gearing helps this giant shear 1½" steel plate

THE terrific pressures generated in cutting a 1½" steel plate 12 feet long are as nothing to this giant shear. Reason: Because there is plenty of extra power, transmitted through Cleveland Worm Gearing.

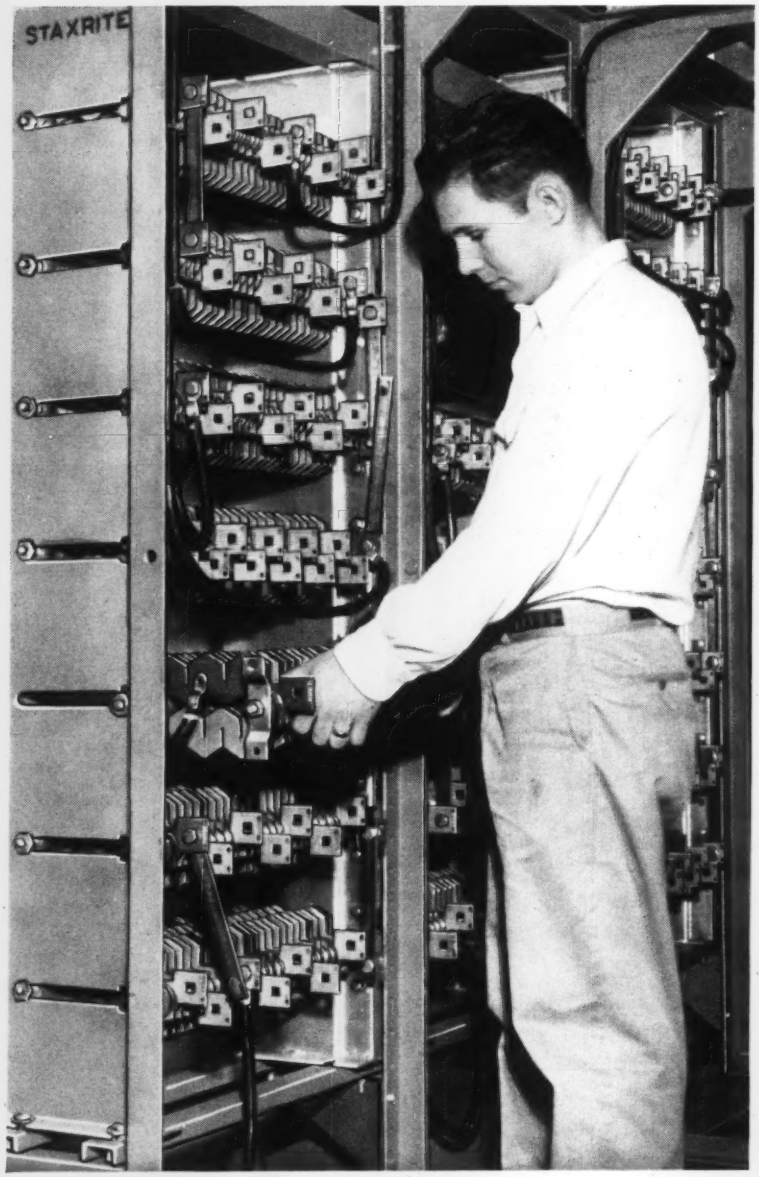
Whenever a drive must operate under extreme pressures, there you'll find Cleveland Worm Gearing at its best. And a Cleveland drive stays dependably on the job no matter how severe the service. It doesn't wear out—its efficiency actually improves with use.

Write for Bulletin 145 which illustrates the many types and sizes of units available in Cleveland Worm Gear Speed Reducers and Drives. Our sales representative near you will sit down with you at your convenience to analyze your drive problems and help you select Clevelands best suited to your needs. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.

CLEVELAND
Worm Gear
Speed Reducers

Complete non-breakable resistor banks... factory assembled, wired and ready to go

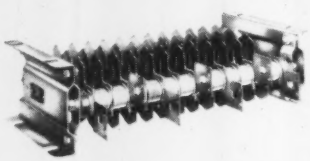


Here is the very latest word in Mill Duty resistors . . . Cutler-Hammer's "draw-out" designed non-breakable mill duty resistors and Staxrite®, the multiple resistor mounting frame. Together these two units become a solid free-standing resistor bank that can be "custom-tailored" to meet your specific needs. Cutler-Hammer's Staxrite resistor frames, available in graduated sizes, will accommodate up to nine non-breakable resistor units. Add to this the optional feature of a terminal board and grid-to-terminal wiring and your resistor bank is ready for rapid installation. No more time consuming box-to-box mounting. Costly on-the-job wiring is cut to a bare minimum. A Staxrite resistor bank saves valuable space too . . . it only requires the floor area of a single resistor box. Notice how easily the "draw-out" designed resistor units slide in and out of position; this is a Cutler-Hammer exclusive. Each resistor unit is completely independent, and can be serviced or replaced by a spare unit without disturbing end frames, adjacent resistor units, or mounting members. "Draw-out" design will cut your "down-time" during maintenance and alterations. Enclosed resistor banks also available . . . added safety for your men and protection for the resistors. For complete information, write or wire today.

CUTLER-HAMMER Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.
Associate: Canadian Cutler-Hammer, Ltd., Toronto.

CUTLER-HAMMER
MOTOR CONTROL
C-H

Cutler-Hammer's Non-breakable Mill Duty Resistors are the choice of Mill engineers everywhere



These extra rugged resistors were designed specifically for mill and crane applications where service is severe. Cutler-Hammer 11011 Mill Duty resistors are available in three standard widths and can be mounted independently or in a Staxrite mounting frame. Check these other important features of design and construction.

- Stamped chrome-steel grids
- Shock-proof
- Vibration-proof
- Corrosion-resistant
- Welded grid joints
- No pressure dependent grid contacts
- Staggered, projected terminals
- Welded grid-to-terminal joints
- Heavy duty mica insulators